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U. S. DEPARTMENT OF THE INTERIOR

Geological Survey

WATER RESOURCES DIVISION

REPORT OF THE

COMMISSIONER OF THE GENERAL LAND OFFICE

TO THE SECRETARY OF THE INTERIOR

IN RESPONSE TO A RESOLUTION OF THE HOUSE OF REPRESENTATIVES

PASSED MAY 1, 1896

AND A RESOLUTION OF THE SENATE

PASSED MAY 1, 1896

C O N T E N T S.

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C H A P. I.
A Comparison of Animals with the inferior
Ranks of Creation.

HAVING given an account of the earth in general, and the advantages and inconveniencies with which it abounds, we now come to consider it more minutely. Having described the habitation, we are naturally led to enquire after the inhabitants. Amidst the infinitely different productions which the earth offers, and with which it is every where covered, animals hold the first rank; as well because of the finer formation of their parts, as of their superior power. The vegetable,

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which is fixed to one spot, and obliged to wait for its accidental supplies of nourishment, may be considered as the prisoner of nature. Unable to correct the disadvantages of its situation, or to shield itself from the dangers that surround it, every object that has motion may be its destroyer.

But, animals are endowed with powers, of motion and defence. The greatest part are capable, by changing place, of commanding Nature; and of thus obliging her to furnish that nourishment which is most agreeable to their state. Those few that are fixed to one spot, even in this seemingly helpless situation, are, nevertheless, protected from external injury, by an hard shelly covering; which they often can close at pleasure, and thus defend themselves from every assault. And here, I think, we may draw the line between the animal and vegetable kingdoms. Every animal, by some means or other, finds protection from injury; either from its force, or courage, its swiftness, or cunning. Some are protected by hiding in convenient places; and others by taking refuge in an hard resisting shell. But, vegetables are totally unprotected; they are exposed to every assailant, and patiently submissive in every attack. In a word, an animal is an organized being that is in some measure

measure provided for its own security; a vegetable is destitute of every protection.

But though it is very easy, without the help of definitions, to distinguish a plant from an animal, yet both possess many properties so much alike, that the two kingdoms, as they are called, seem mixed with each other. Hence it frequently puzzles the naturalist to tell exactly where animal life begins, and vegetative terminates; nor, indeed, is it easy to resolve, whether some objects offered to view be of the lowest of the animal, or the highest of the vegetable races. The sensitive plant, that moves at the touch, seems to have as much perception as the fresh water polypus, that is possessed of a still slower share of motion. Besides, the sensitive plant will not re-produce upon cutting in pieces, which the polypus is known to do; so that the vegetable production seems to have the superiority. But, notwithstanding this, the polypus hunts for its food, as most other animals do. It changes its situation; and, therefore possesses a power of choosing its food, or retreating from danger. Still, therefore, the animal kingdom is far removed above the vegetable; and its lowest denizen is possessed of very great privileges, when compared with the plants with which it is often surrounded.

However, both classes have many resemblances, by which they are raised above the un-organized and inert masses of nature. Minerals are mere inactive, insensible bodies, entirely motionless of themselves, and waiting some external force to alter their forms, or their properties. But it is otherwise with animals and vegetables; these are endued with life and vigour; they have their state of improvement and decay; they are capable of reproducing their kinds; they grow from seeds, in some, and from cuttings in others; they seem all possessed of sensation, in a greater or less degree; they both have their enmities and affections; and as some animals are, by nature, impelled to violence, so some plants are found to exterminate all others, and make a wilderness of the places round them. As the lion makes a desert of the forest where it resides, thus no other plant will grow under the shade of the machinet-tree. Thus, also, that plant, in the West-Indies, called caraguata, clings round whatever tree it happens to approach: there it quickly gains the ascendant; and, loading the same with a verdure not its own, keeps away that nourishment designed to feed the trunk; and, at last, entirely destroys its supporter.

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As all animals are ultimately supported upon vegetables, so vegetables are greatly propagated, by being made a part of animal food. Birds distribute the feeds wherever they fly, and quadrupeds prune them into greater luxuriance. By these means the quantity of food, in a state of nature, is kept equal to the number of the consumers; and, lest some of the weaker ranks of animals should find nothing for their support, but all the provisions be devoured by the strong, different vegetables are appropriated to different appetites. If transgressing this rule, the stronger ranks should invade the rights of the weak, and, breaking through all regard to appetite, should make an indiscriminate use of every vegetable, nature then punishes the transgression, and poison marks the crime as capital.

If again we compare vegetables and animals, with respect to the places where they are found, we shall find them bearing a still stronger similitude. The vegetables that grow in a dry and sunny soil, are strong and vigorous, though not luxuriant; so, also, are the animals of such a climate. Those, on the contrary, that are the joint product of heat and moisture, are luxuriant and tender: and the animals assimilating to the vegetable food, on which they ultimately

mately subsist, are much larger in such places than in others. Thus, in the internal parts of South-America, and Africa, where the sun usually scorches all above, while inundations cover all below, the insects, reptiles, and other animals, grow to a prodigious size: the earth-worm of America is often a yard in length, and as thick as a walking cane; the boiguacu, which is the largest of the serpent kind, is sometimes forty feet in length; the bats, in those countries, are as big as a rabbit; the toads are bigger than a duck, and their spiders are as large as a sparrow. On the contrary, in the cold frozen regions of the north, where vegetable nature is stinted of its growth, the few animals in those climates partake of the diminution; all the wild animals, except the bear, are much smaller than in milder countries; and such of the domestic kinds as are carried thither, quickly degenerate, and grow less. Their very insects are of the minute kinds, their bees and spiders being not half so large as those in the temperate zone.

The similitude between vegetables and animals is no where more obvious than in those that belong to the ocean, where the nature of one is admirably adapted to the necessities of the other. This element it is well known has its vegetables, and its insects
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that feed upon them in great abundance. Over many tracts of the sea, a weed is seen floating, which covers the surface, and gives the resemblance of a green and extensive meadow. On the under side of these unstable plants, millions of little animals are found, adapted to their situation. For as their ground, if I may so express it, lies over their heads, their feet are placed upon their backs; and as land animals have their legs below their bodies, these have them above. At land also, most animals are furnished with eyes to see their food; but at sea, almost all the reptile kinds are without eyes, which might only give them prospects of danger, at a time when unprovided with the means of escaping it*.

Thus, in all places, we perceive an obvious similitude between the animals and the vegetables of every region. In general, however, the most perfect races have the least similitude to the vegetable productions on which they are ultimately fed; while, on the contrary, the meaner the animal, the more local it is found to be, and the more it is influenced by the varieties of the soil where it resides. Many of the more humble reptile kinds are not only confined to one country, but also to a plant; nay, even to a leaf.

Upon

* Linnæi Amœnitates, vol. v. p. 68.

Upon that they subsist; encrease with its vegetation, and seem to decay as it declines. They are merely the circumscribed inhabitants of a single vegetable; take them from that and they instantly die; being entirely assimilated to the plant they feed on, assuming its colour, and even its medicinal properties. For this reason there are infinite numbers of the meaner animals that we have never an opportunity of seeing in this part of the world; they are incapable of living separate from their kindred vegetables, which grow only in a certain climate.

Such animals as are formed more perfect, lead a life of less dependance; and, some kinds are found to subsist in many parts of the world at the same time. But, of all the races of animated nature, man is the least affected by the soil where he resides, and least influenced by the variations of vegetable sustenance: equally unaffected by the luxuriance of the warm climates, or the sterility of the poles, he has spread his habitations over the whole earth; and finds subsistence as well amidst the ice of the north as the burning deserts under the line. All creatures of an inferior nature, as has been said, have peculiar propensities to peculiar climates; they are circumscribed to zones, and confined to territories where
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their proper food is found in greatest abundance ; but, man may be called the animal of every climate, and suffers but very gradual alterations from the nature of any situation.

As to animals of a meaner rank, whom man compels to attend him in his migrations, these being obliged to live in a state of constraint, and upon vegetable food, often different from that of their native soil, they very soon alter their natures with the nature of their nourishment, assimilate to the vegetables upon which they are fed, and thus assume very different habits as well as appearances. Thus, man, unaffected himself, alters and directs the nature of other animals at his pleasure; encreases their strength for his delight, or their patience for his necessities.

And this power of altering the appearances of things seems to have been given him for very wise purposes. The Deity, when he made the earth, was willing to give his favoured creature many opponents, that might at once exercise his virtues, and call forth his latent abilities. Hence we find, in those wide uncultivated wildernesses, where man, in his savage state, owns inferior strength, and the beasts claim divided dominion, that the whole forest swarms
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with noxious animals and vegetables; animals, as yet undescribed, and vegetables which want a name. In those recesses Nature seems rather lavish than magnificent, in bestowing life. The trees are usually of the largest kinds, covered round with parasite plants, and interwoven at the tops with each other. The boughs, both above and below, are peopled with various generations; some of which have never been upon the ground, and others that have never stirred from the branches on which they were produced. In this manner millions of minute, and loathsome creatures, pursue a round of uninterrupted existence, and enjoy a life scarce superior to vegetation. At the same time, the vegetables, in those places, are of the larger kinds, while the animal race is of the smaller: but, man has altered this disposition of nature; having, in a great measure, levelled the extensive forests, cultivated the softer and finer vegetables, destroyed the numberless tribes of minute and noxious animals, and taken every method to encrease a numerous breed of the larger kinds. He thus has exercised a severe control; unpeopled nature, to embellish it; and diminished the size of vegetable, in order to improve that of the animal kingdom.

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To subdue the earth to his own use, was, and ought to be, the aim of man ; which was only to be done by encreasing the number of plants, and diminishing that of animals: to multiply existence, alone was that of the Deity. For this reason, we find, in a state of nature, that animal life is encreased to the greatest quantity possible: and, we can scarce form a system that could add to its numbers. First, plants, or trees, are provided, by Nature, of the largest kinds; and, consequently, the nourishing surface is thus extended. In the second place, there are animals peculiar to every part of the vegetable, so that no part of it is lost. But, the greatest possible encrease of life would still be deficient were there not other animals that lived upon animals themselves; and these are, themselves, in turn, food for some other greater and stronger set of creatures. Were all animals to live upon vegetables alone, thousands would be extinct that now have existence, as the quantity of their provision would shortly fail. But, as things are wisely constituted, one animal now supports another; and thus, all take up less room than they would by living on the same food; as, to make use of a familiar instance, a greater number of people may be crowded into the same space, if each is made to bear his fellow upon his shoulders.

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To diminish the number of animals, and encrease that of vegetables, has been the general scope of human industry; and, if we compare the utility of the kinds, with respect to man, we shall find, that of the vast variety in the animal kingdom, but very few are serviceable to him; and, in the vegetable, but very few are entirely noxious. How small a part of the insect tribes, for instance, are beneficial to mankind, and what numbers are injurious! In some countries they almost darken the air: a candle cannot be lighted without their instantly flying upon it, and putting out the flame. * The closest recesses are no safeguard from their annoyance; and the most beautiful landscapes of nature only serve to invite their rapacity. As these are injurious, from their multitudes; so most of the larger kinds are equally dreadful to him, from their courage and ferocity. In the most uncultivated parts of the forest these maintain an undisputed empire; and man invades their retreats with terror. These are terrible; and there are still more that are utterly useless to him, that serve to take up that room which more beneficial creatures might possess; and incommode him, rather with their numbers than their enmities. Thus, in a catalogue of land animals,

* Ulloa's Description of Guayaquil.

mials, that amounts to more than twenty thousand, we can scarcely reckon up an hundred that are any way useful to him; the rest, being either all his open, or his secret enemies, immediately attacking him in person, or intruding upon that food he has appropriated to himself. Vegetables, on the contrary, though existing in greater variety, are but few of them noxious. The most deadly poisons are often of great use in medicine; and even those plants that only seem to cumber the ground, serve for food to that race of animals which he has taken into friendship, or protection. The smaller tribes of vegetables, in particular, are cultivated, as contributing either to his necessities, or amusement; so that vegetable life is as much promoted, by human industry, as animal life is controlled and diminished.

Hence, it was not without a long struggle, and various combinations, of experience and art, that man acquired his present dominion. Almost every good that he possesses was the result of the contest; for, every day, as he was contending, he was growing more wise; and, patience and fortitude were the fruits of his industry.

From hence, also, we see the necessity of some animals living upon each other, to fill up the plan of Providence; and
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we may, consequently, infer the expediency of man's living upon all. Both animals and vegetables seem equally fitted to his appetites; and, were any religious, or moral motives, to restrain him from taking away life, upon any account, he would only thus give existence to a variety of beings made to prey upon each other; and, instead of preventing, he would only thus multiply mutual destruction.



C H A P. II.

Of the Generation of Animals.

BEFORE we survey animals in their state of maturity, and performing the functions adapted to their respective natures, method requires that we should consider them in the more early periods of their existence. There was a time when the proudest and the noblest animal was a partaker of the same imbecility with the meanest reptile; and, while yet a candidate for existence, was equally helpless and contemptible. In their incipient state all are upon a footing; the insect and the philosopher being equally insensible, clogged with matter, and unconscious of existence. Where then are we to begin with the history of those beings, that make such a distinguished figure in the creation? Or, where lie those peculiar characters in the parts that go to make up animated nature; that mark one animal as destined to creep in the dust, and another to glitter on the throne?

This has been a subject that has employed the curiosity of all ages, and the philosophers of every age have attempted the solution. In tracing up Nature to her most hidden recesses,
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she becomes too minute, or obscure, for our inspection; so that we find it impossible to mark her first differences, to discover the point where animal life begins, or the cause that conduces to set it in motion. We know little more than that the greatest number of animals require the concurrence of a male and female to reproduce their kind; and that these, distinctly and invariably, are found to beget creatures of their own species. Curiosity has, therefore, been active, in trying to discover the immediate result of this union, how far either sex contributes to the bestowing animal life, and whether it be to the male or female that we are most indebted for the privilege of our existence.

Hippocrates has supposed that fecundity proceeded from the mixture of the seminal liquor of both sexes, each of which equally contribute to the formation of the incipient animal. Aristotle, on the other hand, would have the seminal liquor in the male alone to contribute to this purpose, while the female supplied the proper nourishment for its support. Such were the opinions of these fathers of philosophy; and these continued to be adopted by the naturalists, and school-men, of succeeding ages, with blind veneration. At length,
Steno

Steno and Harvey, taking anatomy for their guide, gave mankind a nearer view of nature, just advancing into animation. These perceived in all such animals as produced their young alive, two glandular bodies, near the womb, resembling that ovary, or cluster of small eggs, which is found in fowls; and, from the analogy between both, they gave these also the name of ovaria. These, as they resembled eggs, they naturally concluded had the same offices; and, therefore, they were induced to think that all animals, of what kind soever, were produced from eggs. At first, however, there was some altercation raised against this system; for, as these ovaria were separate from the womb, it was objected that they could not be any way instrumental in replenishing that organ, with which they did not communicate. But, upon more minute inspection, Fallopius, the anatomist, perceived two tubular vessels depending from the womb, which, like the horns of a snail, had a power of erecting themselves, of embracing the ovaria, and of receiving the eggs, in order to be fertilized by the seminal liquor. This discovery seemed, for a long time after, to fix the opinions of philosophers. The doctrine of Hippocrates was re-established, and the chief business of generation was ascribed

to the female. This was, for a long time, the established opinion of the schools; but Lowenhoeck, once more, shook the whole system, and produced a new schism among the lovers of speculation. Upon examining the seminal liquor of a great variety of male animals, with microscopes, which helped his sight more than that of any of his successors, he perceived therein infinite numbers of little living creatures, like tadpoles, very brisk, and floating in the fluid, with a seeming voluntary motion. Each of these, therefore, was thought to be the rudiments of an animal, similar to that from which it was produced; and this only required a reception from the female, together with proper nourishment, to complete its growth. The business of generation was now, therefore, given back to the male a second time, by many; while others suspended their assent, and chose rather to confess ignorance than to embrace error *.

In this manner has the dispute continued for several ages, some accidental discovery serving, at intervals, to renew the debate, and revive curiosity. It was a subject where speculation could find much room to display itself; and, Mr. Buffon, who loved to speculate, would not omit such an opportunity

* Bonet's Considerations sur Corps Organises.

portunity of giving scope to his propensity. According to this most pleasing of all naturalists, the microscope discovers that the seminal liquor, not only of males, but of females also, abounds in these moving little animals, which have been mentioned above, and that they appear equally brisk in either fluid. These he takes not to be real animals, but organical particles, which, being simple, cannot be said to be organized themselves, but which go to the composition of all organized bodies whatsoever. In the same manner as a tooth, in the wheel of a watch, cannot be called either the wheel, or the watch, and yet contributes to the sum of the machine. These organical particles are, according to him, diffused throughout all nature, and to be found not only in the seminal liquor, but in most other fluids in the parts of vegetables, and all parts of animated nature. As they happen, therefore, to be differently applied, they serve to constitute a part of the animal, or the vegetable, whose growth they serve to encrease, while the superfluity is thrown off in the seminal liquor of both sexes, for the re-production of other animals or vegetables of the same species. These particles assume different figures, according to the receptacle into which they enter; falling into the womb they unite into a foetus;

beneath the bark of a tree they pullulate into branches; and, in short, the same particles that first formed the animal in the womb, contribute to encrease its growth when brought forth*.

To this system it has been objected, that it is impossible to conceive organical substances without being organized; and that, if divested of organization themselves, they could never make an organized body, as an infinity of circles could never make a triangle. It has been objected, that it is more difficult to conceive the transformation of these organical particles than even that of the animal, whose growth we are enquiring after; and this system, therefore, attempts to explain one obscure thing by another still more obscure.

But an objection, still stronger than these, has been advanced, by an ingenious countryman of our own; who asserts, that these little animals, which thus appear swimming, and sporting, in almost every fluid we examine with a microscope, are not real living particles, but some of the more opake parts of the fluid, that are thus encreased in size, and seem to have a much greater motion than they have in reality. For the motion being magnified with the object,

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* Mr. Buffon.

the smallest degree of it will seem very considerable ; and a being almost at rest may, by these means, be apparently put into violent action. Thus, for instance, if we look upon the sails of a windmill moving, at a distance, they appear to go very slow ; but, if we approach them, and thus magnify their bulk to our eye, they go round with great rapidity. A microscope, in the same manner, serves to bring our eye close to the object, and thus to enlarge it ; and not only encrease the magnitude of its parts, but of its motion. Hence, therefore, it would follow, that these organical particles that are said to constitute the bulk of living nature, are but mere optical illusions ; and the system founded on them must, like them, be illusive.

These, and many other objections, have been made to this system ; which, instead of enlightening the mind, serve only to shew, that too close a pursuit of Nature chiefly leads to uncertainty. Happily, however, for mankind, the most intricate enquiries are generally the most useless. Instead, therefore, of balancing accounts between the sexes, and attempting to ascertain to which the business of generation most properly belongs, it will be more instructive, as well as amusing, to begin with animal nature, from
its

its earliest retirements, and evanescent outlines, and pursue the incipient creature through all its changes in the womb till it arrives into open day.

The usual distinction of animals, with respect to their manner of generation, has been into the oviparous and viviparous kinds; or, in other words, into those that bring forth an egg, which is afterwards hatched into life, and those that bring forth their young alive and perfect. In one of these two ways all animals were supposed to have been produced, and all other kinds of generation were supposed imaginary or erroneous. But later discoveries have taught us to be more cautious in making general conclusions, and have even induced many to doubt whether animal life may not be produced merely from putrefaction *.

Indeed, the infinite number of creatures that putrid substances seem to give birth to, and the variety of little insects seen floating in liquors, by the microscope, appear to favour this opinion. But, however this may be, the former method of classing animals can now by no means be admitted, as we find many animals that are produced neither from the womb, nor from the shell, but merely from cuttings; so that

* Bonet. Confid. p. 100.

that to multiply life in some creatures, it is sufficient only to multiply the dissection. This being the simplest method of generation, and that in which life seems to require the smallest preparation for its existence, I will begin with it, and so proceed to the two other kinds, from the meanest to the most elaborate.

The earth-worm, the millipedes, the sea-worm, and many marine insects, may be multiplied by being cut in pieces; but the polypus is noted for its amazing fertility; and from hence it will be proper to take the description. The structure of the polypus may be compared to the finger of a glove, open at one end, and closed at the other. The closed end represents the tail of the polypus, with which it serves to fix itself to any substance it happens to be upon; the open end may be compared to the mouth; and, if we conceive six or eight small strings issuing from this end, we shall have a proper idea of its arms, which it can erect, lengthen, and contract, at pleasure, like the horns of a snail. This creature is very voracious, and makes use of its arms as a fisherman does of his net, to catch, and entangle such little animals as happen to come within its reach. It lengthens these arms several inches, keeps them separated from each other, and thus occupies

occupies a large space in the water, in which it resides. These arms, when extended, are as fine as threads of silk, and have a most exquisite degree of feeling. If a small worm happens to get within the sphere of their activity, it is quickly entangled by one of these arms, and, soon after, the other arms come to its aid: these altogether shortening, the worm is drawn into the animal's mouth, and quickly devoured, colouring the body as it is swallowed. Thus much is necessary to be observed of this animal's method of living, to shew that it is not of the vegetable tribe, but a real animal, performing the functions which other animals are found to perform, and endued with powers that many of them are destitute of. But what is most extraordinary remains yet to be told; for, if examined with a microscope, there are seen several little specks, like buds, that seem to pullulate from different parts of its body; and these, soon after appear to be young polypi themselves, and like the large polypus, begin to cast their little arms about for prey, in the same manner. Whatever they happen to ensnare is devoured, and gives a colour not only to their own bodies, but to that of the parent; so that the same food is digested, and serves for the nourishment of both. The food

food of the little one passes into the large polypus, and colours its body; and this, in its turn, digests, and swallows its food to pass into theirs. In this manner every polypus has a new colony sprouting from its body; and these new ones, even while attached to the parent animal, become parents themselves, having a smaller colony also budding from them. All, at the same time, busily employed in seeking for their prey, and the food of any one of them serving for the nourishment, and circulating through the bodies of all the rest. This society, however, is every hour dissolving; those newly produced are seen at intervals to leave the body of the large polypus, and become, shortly after, the head of a beginning colony themselves.

In this manner the polypus multiplies naturally; but, one may take a much readier and shorter way to encrease them, and this only by cutting them in pieces. Though cut into thousands of parts, each part still retains its vivacious quality, each shortly becomes a distinct and a complete polypus; whether cut lengthways, or crossways, it is all the same; this extraordinary creature seems a gainer by our endeavours, and multiplies by apparent destruction. The experiment has been tried, times without number, and still attended with the same success.

success. Here, therefore, naturalists who have been blamed for the cruelty of their experiments upon living animals, may now boast of their encreasing animal life, instead of destroying it. The production of the polypus is a kind of philosophical generation. The famous Sir Thomas Brown hoped one day to be able to produce children by the same method as trees are produced ; the polypus is multiplied in this manner ; and every philosopher may thus, if he pleases, boast of a very numerous, though, I should suppose, a very useless progeny.

This method of generation, from cuttings, may be considered as the most simple kind, and is a strong instance of the little pains Nature takes in the formation of her lower, and humbler productions. As the removal of these from inanimate into animal existence is but small, there are but few preparations made for their journey. No organs of generation seem provided, no womb to receive, no shell to protect them in their state of transition. The little reptile is quickly fitted for all the offices of its humble sphere, and, in a very short time, arrives at the height of its contemptible perfection.

The next generation is of those animals that we see produced from the egg. In this manner

manner all birds, most fishes, and many of the insect tribes, are brought forth. An egg may be considered as a womb, detached from the body of the parent animal, in which the embryo is but just beginning to be formed. It may be regarded as a kind of incomplete delivery, in which the animal is disburthened of its young before its perfect formation. Fishes, and insects, indeed, most usually commit the care of their eggs to hazard; but birds, which are more perfectly formed, are found to hatch them into maturity, by the warmth of their bodies. However, any other heat, of the same temperature, would answer the end as well; for either the warmth of the sun, or of a stove, is equally efficacious in bringing the animal in the egg to perfection. In this respect, therefore, we may consider generation from the egg as inferior to that in which the animal is brought forth alive. Nature has taken care of the viviparous animal in every stage of its existence. That force which separates it from the parent, separates it from life; and the embryo is shielded with unceasing protection till it arrives at exclusion. But it is different with the little animal in the egg; often totally neglected by the parent, and always separable from it, every accident may retard its growth, or even destroy its existence. Besides, art, or accident also, may bring this
animal

animal to a state of perfection; so that it can never be considered as a complete work of Nature, in which so much is left for accident to finish, or destroy.

But, however inferior this kind of generation may be, the observation of it will afford great insight into that of nobler animals, as we can here watch the progress of the growing embryo, in every period of its existence, and catch it in those very moments when it first seems stealing into motion. Malpighi and Haller have been particularly industrious on this subject; and, with a patience almost equalling that of the sitting hen, have attended incubation in all its stages. From them, therefore, we have an amazing history of the chicken in the egg, and of its advances into complete formation.

It would be methodically tedious to describe those parts of the egg, which are well known and obvious; such as its shell, its white, and its yolk; but the disposition of these is not so apparent. Immediately under the shell lies that common membrane, or skin, which lines it on the inside, adhering closely to it every where, except at the broad end, where a little cavity is left, that is filled with air, which encreases as the animal within grows larger. Under this membrane are contained two whites, though seeming to us to be only one, each wrapped up in a
membrane

membrane of its own, one white within the other. In the midst of all is the yolk, wrapt round, likewise, in its own membrane. At each end of this are two ligaments, called chalazæ, which are, as it were, the poles of this microcosm, being white dense substances, made from the membranes, and serving to keep the white and the yolk in their places. It was the opinion of Mr. Derham that they served also for another purpose : for a line being drawn from one ligament to the other, would not pass directly through the middle of the yolk, but rather towards one side, and would divide the yolk into two unequal parts, by which means these ligaments served to keep the smallest side of the yolk always uppermost ; and in this part he supposed the cicatricula, or first speck of life, to reside ; which, by being uppermost, and consequently next the hen, would be thus in the warmest situation. But this is rather fanciful than true, the incipient animal being found in all situations, and not particularly influenced by any*. This cicatricula, which is the part where the animal first begins to shew signs of life, is not unlike a vetch, or a lentil, lying on one side of the yolk, and within its membrane. All these contribute to the little animal's convenience, or support ;

* Haller.

port ; the outer membranes, and ligaments, preserve the fluids in their proper places ; the white serves as nourishment ; and the yolk, with its membranes, after a time, becomes a part of the animal's body *. This is the description of an hen's egg, and answers to that of all others, how large or how small soever.

Previous to putting the eggs to the hen, our philosophers first examined the cicatrix, or little spot, already mentioned ; and which may be considered as the most important part of the egg. This was found, in those that were impregnated by the cock, to be large ; but, in those laid without the cock, very small. It was found by the microscope, to be a kind of bag, containing a transparent liquor, in the midst of which the embryo was seen to reside. The embryo resembled a composition of little threads, which the warmth of future incubation tended to enlarge, by varying, and liquifying the other fluids contained within the shell, and thus pressing them into the pores or tubes of their substance.

Upon placing the eggs in a proper warmth †, either under the sun, or in a stove, after six hours the vital speck begins to dilate, like the pupil of the eye. The head of the chicken is distinctly seen, with
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* Haller.

† Malpighi.

the back-bone, something resembling a tadpole, floating in its ambient fluid, but as yet seeming to assume none of the functions of animal life. In about six hours more the little animal is seen more distinctly; the head becomes more plainly visible, and the vertebræ of the back more easily perceivable. All these signs of preparation for life are encreased in six hours more; and, at the end of twenty-four hours, the ribs begin to take their places, the neck begins to lengthen, and the head to turn to one side.

At this time *, also, the fluids in the egg seem to have changed place; the yolk, which was before in the center of the shell, approaches nearer to the broad end. The watery part of the white is, in some measure, evaporated through the shell, and the grosser part sinks to the small end. The little animal appears to turn towards the part of the broad end, in which a cavity has been described, and with its yolk seems to adhere to the membrane there. At the end of forty hours the great work of life seems fairly begun, and the animal plainly appears to move; the back-bone, which is of a whitish colour, thickens; the head is turned still more one side; the first rudiments of the

* Harvey.

the eyes begin to appear ; the heart beats, and the blood begins already to circulate. The parts, however, as yet are fluid ; but, by degrees, become more and more tenacious, and harden into a kind of jelly. At the end of two days, the liquor, in which the chicken swims, seems to encrease ; the head appears with two little bladders in the place of eyes, the heart beats in the manner of every embryo where the blood does not circulate through the lungs. In about fourteen hours after this, the chicken is grown more strong ; its head, however, is still bent downwards ; the veins and the arteries begin to branch, in order to form the brain ; and the spinal marrow is seen stretching along the back bone. In three days, the whole body of the chicken appears bent ; the head, with its two eyeballs, with their different humours, now distinctly appear ; and five other vesicles are seen, which soon unite to form the rudiments of the brain. The out-lines also of the thighs, and wings begin to be seen, and the body begins to gather flesh. At the end of the fourth day, the vesicles that go to form the brain, approach each other ; the wings and thighs appear more solid ; the whole body is covered with a jelly like flesh ; the heart that was hitherto exposed, is now covered up within the body, by a very thin transparent

transparent membrane; and, at the same time, the umbilical vessels, that unite the animal to the yolk, now appear to come forth from the abdomen. After the fifth and sixth days, the vessels of the brain begin to be covered over; the wings and thighs lengthen; the belly is closed up, and tumid; the liver is seen within it, very distinctly, not yet grown red, but of a very dusky white; both the ventricles of the heart are discerned, as if they were two separate hearts, beating distinctly; the whole body of the animal is covered over; and the traces of the incipient feathers are already to be seen. The seventh day, the head appears very large; the brain is covered entirely over; the bill begins to appear betwixt the eyes; and the wings, the thighs, and the legs, have acquired their perfect figure.* Hitherto, however, the animal appears as if it had two bodies; the yolk is joined to it by the umbilical vessels that come from the belly; and is furnished with its vessels, through which the blood circulates, as through the rest of the body of the chicken, making a bulk greater than that of the animal itself. But towards the end of incubation, the umbilical vessels shorten the yolk, and with it the intestines are thrust up into the body of the chicken,

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* Haller.

by the action of the muscles of the belly; and the two bodies are thus formed into one. During this state, all the organs are found to perform their secretions; the bile is found to be separated, as in grown animals; but it is fluid, transparent, and without bitterness: and the chicken then also appears to have lungs. On the tenth, the muscles of the wings appear, and the feathers begin to push out. On the eleventh, the heart, which hitherto had appeared divided, begins to unite; the arteries which belong to it, join into it, like the fingers into the palm of the hand. All these appearances only come more into view, because the fluids the vessels had hitherto secreted, were more transparent; but as the colour of the fluids deepen, their operations and circulations are more distinctly seen. As the animal thus, by the eleventh day completely formed, begins to gather strength, it becomes more uneasy in its situation, and exerts its animal powers with encreasing force. For some time before it is able to break the shell in which it is imprisoned, it is heard to chirrup, receiving a sufficient quantity of air for this purpose, from that cavity which lies between the membrane and the shell, and which must contain air to resist the external pressure. At length, upon the twentieth day, in some birds

birds sooner, and later in others, the enclosed animal breaks the shell within which it has been confined, with its beak; and, by repeated efforts, at last procures its enlargement.

From this little history we perceive, that those parts which are most conducive to life, are the first that are begun: the head, and the back-bone, which no doubt enclose the brain, and the spinal marrow, though both are too limpid to be discerned, are the first that are seen to exist; the beating of the heart is perceived soon after: the less noble parts seem to spring from these; the wings, the thighs, the feet, and, lastly, the bill. Whatever, therefore, the animal has double, or whatever it can live without the use of, these are latest in production: Nature first sedulously applying to the formation of the nobler organs, without which life would be of short continuance, and would be begun in vain.

The resemblance between the beginning animal in the egg, and the embryo in the womb, is very striking; and this similitude it is that has induced many to assert, that all animals are produced from eggs, in the same manner. They consider an egg excluded from the body by some, and separated into the womb by others, to be actions merely of one kind; with this only differ-

ence, that the nourishment of the one is kept within the body of the parent, and encreases as the embryo happens to want the supply; the nourishment of the other is prepared all at once, and sent out with the beginning animal, as entirely sufficient for its future support. But leaving this to the discussion of anatomists, let us proceed rather with facts than dissertations; and as we have seen the progress of an oviparous animal, or one produced from the shell, let us likewise trace that of a viviparous animal, which is brought forth alive. In this investigation, Graaf has, with a degree of patience, characteristic of his nation, attended the progress and encrease of various animals in the womb, and minutely marked the changes they undergo. Having dissected a rabbit, half an hour after impregnation, he perceived the horns of the womb, that go to embrace and communicate with the ovary, to be more red than before; but no other change in the rest of the parts. Having dissected another, six hours after, he perceived the follicles, or the membrane covering the eggs contained in the ovary, to become reddish. In a rabbit dissected after twenty-four hours, he perceived, in one of the ovaries, three follicles, and, in the other, five, that were changed; being become, from transparent,
dark

dark and reddish. In one dissected after three days, he perceived the horns of the womb very strictly to embrace the ovaries; and he observed three of the follicles in one of them, much longer and harder than before: pursuing his inquisition, he also found two of the eggs actually separated into the horns of the womb, and each about the size of a grain of mustard-seed; these little eggs were each of them enclosed in a double membrane, the inner parts being filled with a very limpid liquor. After four days, he found, in one of the ovaries, four, and in the other, five follicles, emptied of their eggs; and in the horns correspondent to these, he found an equal number of eggs thus separated: these eggs were now grown larger than before, and nearly of the size of sparrow-shot. In five days, the eggs were grown to the size of duck-shot, and could be blown from the part of the womb where they were, by the breath. In seven days, these eggs were found of the size of a pistol-bullet, each covered with its double membrane, and these much more distinct than before. In nine days, having examined the liquor contained in one of these eggs, he found it, from a limpid colour, less fluid, to have got a light cloud floating upon it. In ten days, this cloud began to thicken, and to form an oblong body, of the figure

figure of a little worm : and, in twelve days, the figure of the embryo was distinctly to be perceived, and even its parts came into view. In the region of the breast he perceived two bloody specks ; and two more, that appeared whitish. Fourteen days after impregnation, the head of the embryo was become large and transparent, the eyes prominent, the mouth open, and the rudiments of the ears beginning to appear ; the back-bone, of a whitish colour, was bent towards the breast ; the two bloody specks being now considerably encreased, appeared to be nothing less than the outlines of the two ventricles of the heart ; and the two whitish specks on each side, now appeared to be the rudiments of the lungs ; towards the region of the belly, the liver began to be seen, of a reddish colour ; and a little intricate mass, like ravelled thread, discerned, which soon appeared to be the stomach and the intestines ; the legs soon after began to be seen, and to assume their natural positions : and from that time forth, all the parts being formed, every day only served to develope them still more, until the thirty-first day, when the rabbit brought forth her young, completely fitted for the purposes of their humble happiness.

Having thus seen the stages of generation in the meaner animals, let us take a view of
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its progress in man; and trace the feeble beginnings of our own existence. An account of the lowliness of our own origin, if it cannot amuse, will at least serve to humble us; and it may take from our pride, though it fails to gratify our curiosity. We cannot here trace the variations of the beginning animal, as in the former instances; for the opportunities of inspection are but few and accidental: for this reason, we must be content often to fill up the blanks of our history with conjecture. And first, we are entirely ignorant of the state of the infant in the womb, immediately after conception; but we have good reason to believe, that it proceeds, as in most other animals, from the egg.* Anatomists inform us, that four days after conception, there is found in the womb an oval substance, about the size of a small pea, but longer one way than the other; this little body is formed by an extremely fine membrane, enclosing a liquor a good deal resembling the white of an egg: in this may, even then, be perceived, several small fibres, united together, which form the first rudiments of the embryo. Beside these, are seen another set of fibres, which soon after become the placenta,

* This history of the child in the womb is translated from Mr. Buffon, with some alterations.

placenta, or that body by which the animal is supplied with nourishment.

Seven days after conception, we can readily distinguish, by the eye, the first lineaments of the child in the womb. However, they are as yet without form ; shewing, at the end of seven days, pretty much such an appearance as that of the chicken, after four and twenty hours being a small jelly-like mass, yet exhibiting the rudiments of the head ; the trunk is barely visible ; there likewise is to be discerned a small assemblage of fibres issuing from the body of the infant, which afterwards become the blood-vessels that convey nourishment from the placenta to the child, while enclosed in the womb.

Fifteen days after conception, the head becomes distinctly visible, and even the most prominent features of the visage begin to appear. The nose is a little elevated ; there are two black specks in the place of eyes ; and two little holes, where the ears are afterwards seen. The body of the embryo also is grown larger ; and both above and below, are seen two little protuberances, which mark the places from whence the arms and thighs are to proceed. The length of the whole body, at this time, is less than half an inch.

At the end of three weeks, the body has received very little increase ; but the
legs

legs and feet, with the hands and arms, are become apparent. The growth of the arms is more speedy than that of the legs ; and the fingers are sooner separated than the toes. About this time, the internal parts are found, upon dissection, to become distinguishable. The places of the bones are marked by small thread-like substances, that are yet more fluid even than a jelly. Among them, the ribs are distinguishable, like threads also, disposed on each side of the spine ; and even the fingers and toes scarce exceed hairs in thickness.

In a month, the embryo is an inch long; the body is bent forward, a situation which it almost always assumes in the womb, either because a posture of this kind is the most easy, or because it takes up the least room. The human figure is now no longer doubtful ; every part of the face is distinguishable ; the body is sketched out ; the bowels are to be distinguished as threads ; the bones are still quite soft, but in some places beginning to assume a greater rigidity ; the blood-vessels that go to the placenta, which, as was said, contributes to the child's nourishment, are plainly seen issuing from the navel (being therefore called the umbilical vessels) and going to spread themselves

themselves upon the placenta. According to Hippocrates, the male embryo develops sooner than the female: he adds, that, at the end of thirty days, the parts of the body of the male are distinguishable; while those of the female are not equally so till ten days after.

In six weeks, the embryo is grown two inches long; the human figure begins to grow every day more perfect; the head being still much larger, in proportion to the rest of the body; and the motion of the heart is perceived almost by the eye. It has been seen to beat in an embryo of fifty days old, a long time after it had been taken out of the womb.

In two months, the embryo is more than two inches in length. The ossification is perceivable in the arms and thighs, and in the point of the chin, the under jaw being greatly advanced before the upper. These parts, however, may as yet be considered as bony points, rather than as bones. The umbilical vessels, which before went side by side, are now begun to be twisted, like a rope, one over the other, and go to join with the placenta, which as yet is but small.

In three months, the embryo is above three inches long, and weighs about three ounces. Hippocrates observes, that not till then the mother perceives the child's motion; and he adds,

adds, that in female children, the motion is not observable till the end of four months. However, this is no general rule, as there are women who assert, that they perceived themselves to be quick with child, as their expression is, at the end of two months; so that this quickness seems rather to arise from the proportion between the child's strength, and the mother's sensibility, than from any determinate period of time. At all times, however, the child is equally alive; and, consequently, those juries of matrons that are to determine upon the pregnancy of criminals, should not enquire whether the woman be quick, but whether she be with child; if the latter be perceivable, the former follows of course.

Four months and an half after conception, the embryo is from six to seven inches long. All the parts are so augmented, that even their proportions are now distinguishable. The very nails begin to appear upon the fingers and toes; and the stomach and intestines already begin to perform their functions of receiving and digesting. In the stomach is found a liquor similar to that in which the embryo floats; in one part of the intestines, a milky substance; and, in the other, an excrementitious. There is found also, a small quantity of bile in the gall-bladder; and some urine in
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its own proper receptacle. By this time also, the posture of the embryo seems to be determined. The head is bent forward, so that the chin seems to rest upon its breast; the knees are raised up towards the head, and the legs bent backward, somewhat resembling the posture of those who sit on their haunches. Sometimes the knees are raised so high as to touch the cheeks, and the feet are cross over each other; the arms are laid upon the breast, while one of the hands, and often both, touch the visage; sometimes the hands are shut, and sometimes also, the arms are found hanging down by the body. These are the most usual postures which the embryo assumes; but these it is frequently known to change; and it is owing to these alterations that the mother so frequently feels those twitches, which are usually attended with pain.

The embryo, thus situated, is furnished by Nature with all things proper for its support; and, as it encreases in size, its nourishment also is found to encrease with it. As soon as it first begins to grow in the womb, that receptacle, from being very small, grows larger; and, what is more surprizing, thicker every day. The sides of a bladder, as we know, the more they are distended, the more they become thin. But here, the larger the womb grows the more
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it appears to thicken. Within this the embryo is still farther involved, in two membranes, called the chorion, and amnios; and floats in a thin transparent fluid, upon which it seems, in some measure, to subsist. However, the great storehouse, from whence its chief nourishment is supplied, is called the placenta; a red substance somewhat resembling a sponge, that adheres to the inside of the womb, and communicates, by the umbilical vessels, with the embryo. These umbilical vessels, which consist of a vein and two arteries, issue from the navel of the child, and are branched out upon the placenta; where they, in fact, seem to form its substance; and, if I may so express it, to suck up their nourishment from the womb, and the fluids contained therein. The blood thus received from the womb, by the placenta, and communicated by the umbilical vein to the body of the embryo, is conveyed to the heart; where, without ever passing into the lungs, as in the born infant, it takes a shorter course; for, entering the right auricle of the heart, instead of passing up into the pulmonary artery, it seems to break this partition, and goes directly through the body of the heart, by an opening called the foramen ovale, and from thence to the aorta, or great artery; by which it is driven
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into all parts of the body. Thus we see the placenta, in some measure, supplying the place of lungs; for as the little animal can receive no air by inspiration, the lungs are therefore useless. But we see the placenta converting the fluid of the womb into blood, and sending it, by the umbilical vein, to the heart; from whence it is dispatched by a quicker and shorter circulation through the whole frame.

In this manner the embryo reposes in the womb; supplied with that nourishment which is fitted to its necessities, and furnished with those organs that are adapted to its situation. As its sensations are but few, its wants are in the same proportion; and it is probable that a sleep, with scarce any intervals, marks the earliest period of animal life. As the little creature, however, gathers strength and size, it seems to become more wakeful and uneasy; even in the womb it begins to feel the want of something that it does not possess; a sensation that seems coeval with man's nature, and never leaves him till he dies. The embryo even then begins to struggle for a state more marked by pleasure and pain, and, from about the sixth month, begins to give the mother warning of the greater pain she is yet to endure. The continuation of pregnancy, in woman, is usually nine months; but

but there have been many instances when the child has lived that was born at seven; and some also, are found to continue pregnant a month above the usual time. When the appointed time approaches, the infant, that has for some months been giving painful proofs of its existence, now begins to encrease its efforts for liberty. The head is applied downward, to the apperture of the womb, and by reiterated efforts it endeavours to extend the same: these endeavours produce the pain which all women, in labour, feel in some degree; those of strong constitutions the least, those most weakly the most severely, since we learn, that the women of Africa always deliver themselves, and are well a few hours after; while those of Europe require assistance, and recover more slowly. Thus the infant, still continuing to push with its head forward, by the repetition of its endeavours, at last succeeds, and issues into life. The blood, which had hitherto passed through the heart, now takes a wider circuit; and the foramen ovale closes; the lungs, that had till this time been inactive, now first begin their functions; the air rushes in to distend them; and this produces the first sensation of pain, which the infant expresses by a shriek;
so

so that the beginning of our lives, as well as the end, is marked with anguish. *

From comparing these accounts, we perceive that the most laboured generation is the most perfect; and that the animal, which, in proportion to its bulk, takes the longest time for production, is always the most complete when finished. Of all others, man seems the slowest in coming into life, as he is the slowest in coming to perfection; other animals, of the same bulk, seldom remain in the womb above six months, while he continues nine; and even after his birth appears more than any other to have his state of imbecility prolonged.

We may observe also, that that generation is the most complete in which the fewest animals are produced: Nature, by attending to the production of one at a time, seems to exert all her efforts in bringing it to perfection; but, where this attention is divided, the animals so produced come into the world with partial advantages. In this manner twins are never, at least while infants, so large, or so strong, as those that come singly into the world; each having, in some measure, robbed the other of its right; as that support, which Nature meant for one, has been prodigally divided.

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* Bonet Contemplat. de la Nature, vol. i. p. 212.

In this manner, as those animals are the best that are produced singly, so we find that the noblest animals are ever the least fruitful. These are seen usually to bring forth but one at a time, and to place all their attention upon that alone. On the other hand, all the oviparous kinds produce in amazing plenty; and even the lower tribes of viviparous animals encrease in a seeming proportion to their minuteness and imperfection. Nature seems lavish of life in the lower orders of the creation; and, as if she meant them entirely for the use of the nobler races, she appears to have bestowed greater pains in multiplying the number than in completing the kind. In this manner, while the elephant, and the horse, bring forth but one at a time, the spider and the beetle are seen to produce a thousand: and even among the smaller quadrupedes themselves, all the inferior kinds are extremely fertile; any one of these being found, in a very few months, to become the parent of a numerous progeny.

In this manner, therefore, the smallest animals multiply in the greatest proportion; and we have reason to thank Providence that the most formidable animals are the least fruitful. Had the lion and the tyger the same degree of fecundity with

the rabbit, or the rat, all the arts of man would be unable to oppose these fierce invaders ; and we should soon perceive them become the tyrants of those who claim the lordship of the creation. But Heaven, in this respect, has wisely consulted the advantage of all. It has opposed to man only such enemies as he has art and strength to conquer ; and as large animals require proportional supplies, Nature was unwilling to give new life, where it, in some measure, denied the necessary means of subsistence.

In consequence of this pre-established order, the animals that are endowed with the most perfect methods of generation, and bring forth but one at a time, seldom begin to procreate till they have almost acquired their full growth. On the other hand, those which bring forth many, engender before they have arrived at half their natural size. The horse, and the bull, come almost to perfection before they begin to generate ; the hog, and the rabbit, scarce leave the teat before they become parents themselves. In whatever light, therefore, we consider this subject, we shall find that all creatures approach most to perfection, whose generation most nearly resembles that of man. The reptile produced from cutting is but one degree above
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the vegetable. The animal produced from the egg is still a step higher in the scale of existence ; that class of animals which are brought forth alive, are still more exalted. Of these, such as bring forth one at a time are the most complete ; and foremost of these stands man, the great master of all, who seems to have united the perfections of all the rest in his formation.



C H A P. II.

The Infancy of Man.

W H E N we take a survey of the various classes of animals, and examine their strength, their beauty, or their structure, we shall find man to possess most of those advantages united, which the rest enjoy partially. Infinitely superior to all others in the powers of the understanding, he is also superior to them in the fitness and proportions of his form. He would, indeed, have been one of the most miserable beings upon earth, if with a sentient mind he was so formed as to be incapable of obeying its impulse ; but Nature has otherwise provided ; as with the most extensive intellects to command, she has furnished him with a body the best fitted for obedience.

In infancy *, however, that mind, and this body, form the most helpless union in all animated nature ; and, if any thing can give us a picture of complete imbecility, it is a man when just come into the world. The infant just born, stands in need of all things, without the power of procuring any. The lower races of animals, upon

* Buffon, vol. iv. p. 173.

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being produced, are active, vigorous, and capable of self-support ; but the infant is obliged to wait in helpless expectation ; and its cries are its only aid to procure subsistence.

An infant just born may be said to come from one element into another ; for from the watery fluid in which it was surrounded, it now immerses into air ; and its first cries seem to imply how greatly it regrets the change. How much longer it could have continued in a state of almost total insensibility, in the womb, is impossible to tell ; but it is very probable that it could remain there some hours more. In order to throw some light upon this subject, Mr. Buffon so placed a pregnant bitch as that her puppies were brought forth in warm water, in which he kept them above half an hour at a time. However, he saw no change in the animals, thus newly brought forth ; they continued the whole time vigorous ; and, during the whole time, it is very probable that the blood circulated through the same channels through which it passed while they continued in the womb.

Almost all animals have their eyes closed*, for some days after being brought into the world. The infant opens them the in-

* Buffon, *ibid.*

stant of its birth. However, it seems to keep them fixed and idle ; they want that lustre which they acquire by degrees ; and if they happen to move, it is rather an accidental gaze than an exertion of the act of seeing. The light alone seems to make the greatest impression upon them. The eyes of infants are sometimes found turned to the place where it is strongest ; and the pupil is seen to dilate and diminish, as in grown persons, in proportion to the quantity it receives. But still, the infant is incapable of distinguishing objects ; the sense of seeing, like the rest of the senses, requires an habit before it becomes any way serviceable. All the senses must be compared with each other, and must be made to correct the defects of one another, before they can give just information. It is probable, therefore, that if the infant could express its own sensations, it would give a very extraordinary description of the illusions which it suffers from them. The sight might, perhaps, be represented as inverting objects, or multiplying them ; the hearing, instead of conveying one uniform tone, might be said to bring up an interrupted succession of noises ; and the touch apparently would divide one body into as many as there are fingers that grasped it. But
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all these errors are lost in one common confused idea of existence; and it is happy for the infant, that it then can make but very little use of its senses, when they could serve only to bring it false information.

If there be any distinct sensations, those of pain seem to be much more frequent and stronger than those of pleasure. The infant's cries are sufficient indications of the uneasinesses it must at every interval endure; while, in the beginning, it has got no external marks to testify its satisfactions. It is not till after forty days that it is seen to smile; and not till that time also, the tears begin to appear, its former expressions of uneasiness being always without them. As to any other marks of the passions, the infant being as yet almost without them, it can express none of them in its visage; which, except in the act of crying and laughing, is fixed in a settled serenity. All the other parts of the body seem equally relaxed and feeble: its motions are uncertain, and its postures without choice; it is unable to stand upright; its hams are yet bent, from the habit which it received from its position in the womb; it has not strength enough in its arms to stretch them forward, much less to grasp any thing with its hands; it rests just in the

the posture it is laid; and, if abandoned, must still continue in the same position.

Nevertheless, though this be the description of infancy among mankind in general, there are countries, and races, among whom infancy does not seem marked with such utter imbecility, but where the children, not long after they are born, appear possessed of a greater share of self-support. The children of Negroes have a surprizing degree of this premature industry: they are able to walk at two months; or, at least, to move from one place to another: they also hang to the mother's back without any assistance, and seize the breast over her shoulder, continuing in this posture till she thinks proper to lay them down. This is very different in the children of our countries, that seldom are able to walk under a twelvemonth.

The skin of children newly brought forth, is always red, proceeding from its transparency, by which the blood beneath appears more conspicuous. Some say that this redness is greatest in those children that are afterwards about to have the finest complexions; and it stands to reason that it should be so, since the thinnest skins are always the fairest. The size of a new-born infant is generally about twenty inches, and its weight about twelve pounds. The head
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is large, and all the members delicate, soft, and puffy. These appearances alter with its age; as it grows older, the head becomes less in proportion to the rest of the body; the flesh hardens; the bones, that before birth grew very thick in proportion, now lengthen by degrees, and the human figure more and more acquires its due dimensions. In such children, however, as are but feeble or sickly, the head always continues too big for the body; the heads of dwarfs being extremely large in proportion.

Infants, when newly born, pass most of their time in sleeping, and awake with crying, excited either by sensations of pain, or of hunger. Man, when come to maturity, but rarely feels the want of food, as eating twice or thrice in the four and twenty hours is known to suffice the most voracious: but the infant may be considered as a little glutton, whose only pleasure consists in its appetite; and this, except when it sleeps, it is never easy without satisfying. Thus Nature has adapted different desires to the different periods of life; each as it seems most necessary for human support or succession. While the animal is yet forming, hunger excites it to that supply which is necessary for its growth; when it is completely formed, a different appetite takes place, that incites it to communicate existence.

ence. These two desires take up the whole attention at different periods, but are very seldom found to prevail strongly together in the same age; one pleasure ever serving to repress the other: and, if we find a person of full age, placing a principal part of his happiness in the nature and quantity of his food, we have strong reasons to suspect, that with respect to his other appetites, he still retains a part of the imbecility of his childhood.

It is extraordinary enough, however, that infants, who are thus more voracious than grown persons, are nevertheless more capable of sustaining hunger. We have several instances, in accidental cases of famine, in which the child has been known to survive the parent; and they have been seen clinging to the breast of their dead mother. Their little bodies also, are more patient of cold; and we have similar instances of the mother's perishing in the snow, while the infant has been found alive beside her. However, if we examine the internal structure of infants, we shall find no obvious reason for both these advantages. Their blood-vessels are known to be much larger than in adults; and their nerves much thicker and softer: thus, being furnished with a more copious quantity of juices, both of the nervous and sanguinary kinds, the
infant

infant finds a temporary sustenance in this superfluity, and does not expire till both are exhausted. The circulation also being larger and quicker, supplies it with proportionable warmth, so that it is more capable of resisting the accidental rigours of the weather.

The first nourishment of infants is well known to be the mother's milk; and, what is remarkable, the infant itself has milk in its own breasts, which may be squeezed out by compression: this nourishment becomes less grateful as the child gathers strength; and perhaps, also, more unwholesome. However, in cold countries, which are unfavourable to propagation, and where the female has seldom above three or four children at the most, during her life, she continues to suckle the child for four or five years together. In this manner the mothers of Canada and Greenland are often seen suckling two or three children, of different ages, at a time.

The life of infants is very precarious, till the age of three or four, from which time it becomes more secure; and when a child arrives at its seventh year, it is then considered as a more certain life, as Mr. Buffon asserts, than at any other age whatever. It appears, from Simpson's Tables, that of a certain number of children born
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at the same time, a fourth part are found dead, at the end of the first year; more than two thirds at the end of the second; and, at least, half, at the end of the third: so that those who live to be above three years old, are indulged a longer term than half the rest of their fellow-creatures. Nevertheless, life, at that period, may be considered as mere animal existence; and rather a preparation for, than an enjoyment of those satisfactions, both of mind and body, that make life of real value: and hence it is more natural for mankind to deplore a fellow-creature, cut off in the bloom of life, than one dying in early infancy. The one, by living up to youth, and thus wading through the disadvantageous parts of existence, seems to have earned a short continuance of its enjoyments; the infant, on the contrary, has served but a short apprenticeship to pain; and, when taken away, may be considered as rescued from a long continuance of misery.

There is something very remarkable in the growth of the human body*. The embryo in the womb continues to encrease still more and more, till it is born. On the other hand, the child's growth is less every year, till the time of puberty, when it seems to start up of a sudden.

* Buffon, vol. iv. p. 173.

Thus,

Thus, for instance, the embryo, which is an inch long, in the first month, grows but one inch and a quarter in the second; it then grows one and an half in the third; two and an half in the fourth; and in this manner it keeps encreasing, till in the last month of its continuance it is actually found to grow four inches; and, in the whole, about eighteen inches long. But it is otherwise with the child when born: if we suppose it eighteen inches at that time, it grows, in the first year, six or seven inches; in the second year, it grows but four inches; in the third year, about three; and so on, at the rate of about an inch and an half, or two inches, each year, till the time of puberty, when Nature seems to make one great last effort, to complete her work, and unfold the whole animal machine.

The growth of the mind in children seems to correspond with that of the body. The comparative progress of the understanding is greater in infants than in children of three or four years old. If we only reflect a moment on the amazing acquisitions that an infant makes in the first and second years of life, we shall have much cause for wonder. Being sent into a world where every thing is new and unknown, the first months of life are spent in a kind of torpid

torpid amazement ; an attention distracted by the multiplicity of objects that press to be known. The first labour, therefore, of the little learner is, to correct the illusions of the senses, to distinguish one object from another, and to exert the memory, so as to know them again. In this manner a child of a year old has already made a thousand experiments ; all which it has properly ranged, and distinctly remembers. Light, heat, fire, sweets, and bitters, sounds soft or terrible, are all distinguished at the end of a very few months. Besides this, every person the child knows, every individual object it becomes fond of, its rattles, or its bells, may be all considered as so many new lessons to the young mind, with which it has not become acquainted, without repeated exertions of the understanding. At this period of life, the knowledge of every individual object cannot be acquired without the same effort which, when grown up, is employed upon the most abstract idea: every thing the child hears or sees, all the marks and characters of nature, are as much unknown, and require the same attention to attain, as if the reader were set to understand the characters of an Ethiopic manuscript : and yet we see in how short a time the little student begins to understand them all,

all, and to give evident marks of early industry.

It is very amusing to pursue the young mind, while employed in its first attainments. At about a year old, the same necessities that first engaged its faculties, encrease, as its acquaintance with nature enlarges. Its studies, therefore, if I may use the expression, are no way relaxed; for having experienced what gave pleasure at one time, it desires a repetition of it from the same object; and, in order to obtain this, that object must be pointed out: here, therefore, a new necessity arises, which, very often, neither its little arts nor importunities can remove; so that the child is at last obliged to set about naming the objects it desires to possess or avoid. In beginning to speak, which is usually about a year old, children find a thousand difficulties. It is not without repeated trials that they come to pronounce any one of the letters; nor without an effort of the memory, that they can retain them. For this reason, we frequently see them attempting a sound which they had learned, but forgot; and when they have failed, I have often seen their attempt attended with apparent confusion. The letters soonest learned, are those which are most easily formed; thus A and B require an obvious disposition of the organs,
and

and their pronunciation is consequently soon attained. Z and R, which require a more complicated position, are learned with greater difficulty. And this may, perhaps, be the reason why the children in some countries speak sooner than in others ; for the letters mostly occurring in the language of one country, being such as are of easy pronunciation, that language is of course more easily attained. In this manner the children of the Italians are said to speak sooner than those of the Germans ; the language of the one being smooth and open ; that of the other crowded with consonants, and extremely guttural.

But be this as it will, in all countries, children are found able to express the greatest part of their wants by the time they arrive at two years old ; and from the moment the necessity of learning new words ceases, they relax their industry. It is then that the mind, like the body, seems every year to make slow advances ; and, in order to spur up attention, many systems of education have been contrived.

Almost every philosopher who has written on the education of children, has been willing to point out a method of his own, chiefly professing to advance the health, and improve the intellects at the same time. These are usually found
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to begin with finding nothing right in the common practice ; and by urging a total reformation. In consequence of this, nothing can be more wild or imaginary than their various systems of improvement. Some will have the children every day plunged in cold water, in order to strengthen their bodies ; they will have them converse with the servants in nothing but the Latin language, in order to strengthen their minds ; every hour of the day must be appointed for its own studies, and the child must learn to make these very studies an amusement ; till about the age of ten or eleven it becomes a prodigy of premature improvement. Quite opposite to this, we have others, whom the courtesy of mankind also calls philosophers : and they will have the child learn nothing till the age of ten or eleven, at which the former has attained so much perfection ; with them the mind is to be kept empty, until it has a proper distinction of some metaphysical ideas about truth ; and the promising pupil is debarred the use of even his own faculties, lest they should conduct him into prejudice and error. In this manner, some men, whom fashion has celebrated for profound and fine thinkers, have given their hazarded and untried conjectures, upon one of the most important subjects in the world, and the

most interesting to humanity. When men speculate at liberty upon innate ideas, or the abstracted distinctions between will and power, they may be permitted to enjoy their systems at pleasure, as they are harmless, although they may be wrong; but when they alledge that children are to be every day plunged in cold water, and, whatever be their constitution, indiscriminately enured to cold and moisture; that they are to be kept wet in the feet, to prevent their catching cold; and never to be corrected when young, for fear of breaking their spirits when old; these are such noxious errors, that all reasonable men should endeavour to oppose them. Many have been the children whom these opinions, begun in speculation, have injured or destroyed in practice; and I have myself seen many a little philosophical martyr, whom I wished, but was unable to relieve.

If any system be now therefore necessary, it is one that would serve to shew, a very plain point; that very little system is necessary. The natural and common course of education is in every respect the best: I mean that in which the child is permitted to play among its little equals, from whose similar instructions it often gains the most useful stores of knowledge. A child is not idle because it is playing about the fields,
or

or pursuing a butterfly ; it is all this time storing its mind with objects, upon the nature, the properties, and the relations of which future curiosity may speculate.

I have ever found it a vain task to try to make a child's learning its amusement ; nor do I see what good end it would answer were it actually attained. The child, as was said, ought to have its share of play, and it will be benefited thereby ; and for every reason also, it ought to have its share of labour. The mind, by early labour, will be thus accustomed to fatigues and subordination ; and whatever be the person's future employment in life, he will be better fitted to endure it : he will be thus enabled to support the drudgeries of office with content ; or to fill up the vacancies of life with variety. The child, therefore, should by times be put to its duty ; and be taught to know, that the task is to be done, or the punishment to be endured. I do not object against alluring it to duty by reward ; but we well know, that the mind will be more strongly stimulated by pain ; and both may, upon some occasions, take their turn to operate. In this manner, a child, by playing with its equals abroad, and labouring with them at school, will acquire more health and knowledge than by being bred

up under the wing of any speculative system-maker ; and will be thus qualified for a life of activity and obedience. It is true, indeed, that when educated in this manner, the boy may not be so seemingly sensible and forward as one bred up under solitary instruction ; and, perhaps, this early forwardness is more engaging than useful. It is well known, that many of those children who have been such prodigies of literature before ten, have not made an adequate progress to twenty. It should seem, that they only began learning manly things before their time ; and, while others were busied in picking up that knowledge adapted to their age and curiosity, these were forced upon subjects unsuited to their years ; and, upon that account alone, appearing extraordinary. The stock of knowledge in both may be equal ; but with this difference, that each is yet to learn what the other knows.

But whatever may have been the acquisitions of children at ten or twelve, their greatest, and most rapid progress, is made when they arrive near the age of puberty. It is then that all the powers of nature seem at work in strengthening the mind, and completing the body : the youth acquires courage, and the virgin modesty ; the mind,
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with new sensations, assumes new powers; it conceives with greater force, and remembers with greater tenacity. About this time, therefore, which is various in different countries, more is learned in one year than in any two of the preceding: and on this age, in particular, the greatest weight of instruction ought to be thrown.



C H A P. IV.

Of Puberty.

IT has been often said, that the season of youth is the season of pleasures: but this can only be true in savage countries, where but little preparation is made for the perfection of human nature; and where the mind has but a very small part in the enjoyment. It is otherwise in those places where nature is carried to the highest pitch of refinement, in which this season of the greatest sensual delight is wisely made subservient to the succeeding, and more rational one of manhood. Youth, with us, is but a scene of preparation; a drama, upon the right conduct of which all future happiness is to depend. The youth who follows his appetites, too soon seizes the cup, before it has received its best ingredients; and, by anticipating his pleasures, robs the remaining parts of life of their share; so that his eagerness only produces a manhood of imbecility, and an age of pain.

The time of puberty is different in various countries, and always more late in men than in women. In the warm countries of India, the
women

women are marriageable at nine or ten, and the men at twelve or thirteen. It is also different in cities, where the inhabitants lead a more soft, luxurious life, from the country, where they work harder, and fare less delicately. Its symptoms are seldom alike in different persons; but it is usually known by a swelling of the breasts in one sex, and a roughness of the voice in the other. At this season also, the women seem to acquire new beauty, while the men lose all that delicate effeminacy of countenance which they had when boys.

All countries, in proportion as they are civilized, or barbarous, improve, or degrade the nuptial satisfaction. In those miserable regions, where strength makes the only law, the stronger sex exerts its power, and becomes the tyrant over the weaker: while the inhabitant of Negroland is indolently taking his pleasure in the fields, his wife is obliged to till the grounds, that serve for their mutual support. It is thus in all barbarous countries, where the men throw all the laborious duties of life upon the women; and, regardless of beauty, put the softer sex to those employments that must effectually destroy it.

But, in countries that are half barbarous, particularly wherever Mahometanism prevails,

vails, the men run into the very opposite extreme. Equally brutal with the former, they exert their tyranny over the weaker sex, and consider that half of the human creation as merely made to be subservient to the depraved desires of the other. The chief, and indeed the only aim of an Asiatic, is to be possessed of many women; and to be able to furnish a seraglio is the only tendency of his ambition. As the savage was totally regardless of beauty, he, on the contrary, prizes it too highly; he excludes the person who is possessed of such personal attractions, from any share in the duties, or employments of life; and, as if willing to engross all beauty to himself, increases the number of his captives in proportion to the progress of his fortune. In this manner he vainly expects to augment his satisfactions, by seeking from many that happiness which he ought to look for in the society of one alone. He lives a gloomy tyrant, amidst wretches of his own making; he feels none of those endearments which spring from affection, none of those delicacies which arise from knowledge. His mistresses, being shut out from the world, and totally ignorant of all that passes there, have no arts to entertain his mind, or calm his anxieties; the day passes with them in fullen silence, or languid repose; appetite can furnish but few opportunities

tunities of varying the scene; and all that falls beyond it must be irksome expectation.

From this avarice of women, if I may be allowed to express it so, has proceeded that jealousy and suspicion which ever attends the miser: hence those low and barbarous methods of keeping the women of those countries guarded, and of making, and procuring eunuchs to attend them. These unhappy creatures are of two kinds, the white and the black. The white are generally made in the country where they reside, being but partly deprived of the marks of virility; the black are generally brought from the interior parts of Africa, and are made entirely bare. These are chiefly chosen for their deformity; the thicker the lips, the flatter the nose, and the more black the teeth, the more valuable the eunuch; so that the vile jealousy of mankind here inverts the order of Nature; and the poor wretch finds himself valued in proportion to his deficiencies. In Italy, where this barbarous custom is still retained, and eunuchs are made, in order to improve the voice, the laws are severely aimed against such practice; so that being entirely prohibited, none but the poorest, and most abandoned of the people, still secretly practise it upon their children. Of those served in this manner, not one in ten is found
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to become a finger ; but such is the luxurious folly of the times, that the success of one amply compensates for the failure of the rest. It is very difficult to account for the alterations which castration makes in the voice, and the other parts of the body. The eunuch is shaped differently from others. His legs are of an equal thickness above and below ; his knees weak ; his shoulders narrow ; and his beard thin and downy. In this manner his person is rendered more deformed ; but his desires, as I am told, still continue the same ; and actually, in Asia, some of them are found to have their seraglios, as well as their masters. Even in our country, we have an instance of a very fine woman's being married to one of them, whose appearance was the most unpromising ; and, what is more extraordinary still, I am told, that this couple continue perfectly happy in each other's society.

The mere necessities of life seem the only aim of the savage ; the sensual pleasures are the only study of the semi-barbarian ; but the refinement of sensuality, by reason, is the boast of real politeness. Among the merely barbarous nations, such as the natives of Madagascar, or the inhabitants of Congo, nothing is desired so ardently as to prostitute their wives, or daughters,

daughters, to strangers, for the most trifling advantages ; they will account it a dishonour not to be among the foremost who are thus received into favour ; on the other hand, the Mahometan keeps his wife faithful, by confining her person ; and would instantly put her to death if he but suspected her chastity. With the politer inhabitants of Europe both these barbarous extremes are avoided, the woman's person is left free, and no constraint is imposed but upon her affections. The passion of love, which may be considered as the nice conduct of ruder desire, is only known, and practised in this part of the world ; so that what other nations guard as their right, the more delicate European is contented to ask as a favour. In this manner, the concurrence of mutual appetite contributes to encrease mutual satisfaction ; and the power on one side of refusing, makes every blessing more grateful when obtained by the other. In barbarous countries, woman is considered merely as an useful slave ; in such as are somewhat more refined, she is regarded as a desirable toy ; in countries entirely polished, she enjoys juster privileges ; the wife being considered as an useful friend, and an agreeable mistress. Her mind is still more prized than her person ; and without the improvement

improvement of both, she can never expect to become truly agreeable; for her good sense alone can preserve what she has gained by her beauty.

Female beauty, as was said, is always seen to improve about the age of puberty: but, if we should attempt to define in what this beauty, consists or what constitutes its perfection, we should find nothing more difficult to determine. Every country has its peculiar way of thinking, in this respect; and even the same country thinks differently, at different times. The ancients had a very different taste from what prevails at present. The eye-brows joining in the middle was considered as a very peculiar grace, by Tibullus, in the enumeration of the charms of his mistress. Narrow foreheads were approved of, and scarce any of the Roman ladies that are celebrated for their other perfections, but are also praised for the redness of their hair. The nose also of the Grecian Venus, was such as would appear at present an actual deformity; as it fell in a straight line from the forehead, without the smallest sinking between the eyes; without which we never see a face at present.

Among the moderns, every country seems to have peculiar ideas of beauty.* The Persians

* Mr. Buffon.

Persians admire large eye-brows, joining in the middle; the edges and corners of the eyes are tinged with black, and the size of the head is increased by a great variety of bandages, formed into a turban. In some parts of India, black teeth and white hair, are desired with ardour; and one of the principal employments of the women of Thibet, is to redden the teeth with herbs, and to make their hair white by a certain preparation. The passion for coloured teeth obtains also in China, and Japan; where, to complete their idea of beauty, the object of desire must have little eyes, nearly closed, feet extremely small, and a waist far from being shapely. There are some nations of the American Indians, that flatten the heads of their children, by keeping them, while young, squeezed between two boards, so as to make the visage much larger than it would naturally be. Others flatten the head at top; and others still make it as round as they possibly can. The inhabitants along the western coasts of Africa, have a very extraordinary taste for beauty. A flat nose, thick lips, and a jet black complexion, are there the most indulgent gifts of Nature. Such, indeed, they are all, in some degree, found to possess. However, they take care, by art, to increase these natural deformities, as they should seem

seem to us ; and they have many additional methods of rendering their persons still more frightfully pleasing. The whole body and visage is often scarred with a variety of monstrous figures ; which is not done without great pain, and repeated incision ; and even sometimes, parts of the body are cut away. But it would be endless to remark the various arts which caprice, or custom, has employed to distort and disfigure the body, in order to render it more pleasing : in fact, every nation, how barbarous soever, seems unsatisfied with the human figure, as Nature has left it, and has its peculiar arts of heightening beauty. Painting, powdering, cutting, boring the nose, and the ears, lengthening the one, and depressing the other, are arts practised in many countries ; and, in some degree, admired in all. These arts might have been at first introduced to hide epidemic deformities ; custom, by degrees, reconciles them to the view ; till, from looking upon them with indifference, the eye at length begins to gaze with pleasure.

C H A P. V.

Of the Age of Manhood.*

TH E human body attains to its full height during the age of puberty ; or, at least, a short time after. Some young people are found to cease growing at fourteen, or fifteen ; others continue their growth till two or three and twenty. During this period they are all of a slender make ; their thighs and legs small, and the muscular parts as yet unfilled. But, by degrees, the fleshy fibres augment ; the muscles swell, and assume their figure ; the limbs become proportioned, and rounder ; and, before the age of thirty, the body, in men, has acquired the most perfect symmetry. In women, the body arrives at perfection much sooner, as they arrive at the age of maturity more early ; the muscles, and all the other parts being weaker, less compact, and solid, than those of man, they require less time in coming to perfection ; and, as they are less in size, that size
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* This chapter is translated from Mr. Buffon, whose description is very excellent. Whatever I have added is marked by inverted commas, "thus." And in whatever trifling points I have differed, the notes will serve to shew.

is sooner completed. Hence the persons of women are found to be as complete at twenty, as those of men are found to be at thirty.

The body of a well-shaped man ought to be square ; the muscles should be expressed with boldness, and the lines of the face strongly marked. In the woman, all the colours should be rounder, the lines softer, and the features more delicate. Strength and majesty belong to the man, grace and softness are the peculiar embellishments of the other sex. In both, every part of their form declares their sovereignty over other creatures. Man supports his body erect ; his attitude is that of command ; and his face, which is turned towards the heavens, displays the dignity of his station. The image of his soul is painted in his visage ; and the excellence of his nature penetrates through the material form in which it is enclosed. His majestic port, his sedate, and resolute step, announce the nobleness of his rank. He touches the earth only with his extremity ; and beholds it as if at a disdainful distance. His arms are not given him, as to other creatures, for pillars of support ; nor does he lose, by rendering them callous against the ground, that delicacy of touch which furnishes him with so many of his enjoyments. His hands are made for very different purposes ;

purposes; to second every intention of his will, and to perfect the gifts of Nature.

When the soul is at rest, all the features of the visage seem settled in a state of profound tranquility. Their proportion, their union, and their harmony seem to mark the sweet serenity of the mind, and give a true information of what passes within. But, when the soul is excited, the human visage becomes a living picture; where the passions are expressed with as much delicacy as energy, where every motion is designed by some correspondent feature, where every impression anticipates the will, and betrays those hidden agitations, that the man would often wish to conceal.

It is particularly in the eyes that the passions are painted; and in which we may most readily discover their beginning. The eye seems to belong to the soul more than any other organ; it seems to participate of all its emotions; as well the most soft and tender, as the most tumultuous and forceful. It not only receives, but transmits them by sympathy; the observing eye of one catches the secret fire from another; and the passion thus often becomes general.

Such persons as are short sighted labour under a particular disadvantage, in this respect. They are, in a manner, entirely cut

off from the language of the eyes ; and this gives an air of stupidity to the face, which often produces very unfavourable prepossessions. However intelligent we find such persons to be, we can scarcely be brought back from our first prejudice, and often continue in the first erroneous opinion. In this manner we are too much induced to judge of men by their physiognomy ; and having, perhaps, at first, caught up our judgments prematurely, they mechanically influence us all our lives after. This extends even to the very colour, or the cut of peoples cloaths ; and we should for this reason be careful, even in such trifling particulars, since they go to make up a part of the total judgment which those we converse with may form to our advantage.

The vivacity, or the languid motion of the eyes, gives the strongest marks to physiognomy ; and their colour contributes still more to enforce the expression. The different colours of the eye are the dark hazle, the light hazle, the green, the blue, the grey, the whitish grey, " and also the red." These different colours arise from the different colours of the little " muscles that serve to contract the pupil ; and they are very often found to change colour with disorder, and with age."

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The most ordinary colours are the hazle and the blue, and very often both these colours are found in the eyes of the same person. Those eyes which are called black are only of the dark hazle, which may be easily seen upon closer inspection; however, those eyes are reckoned the most beautiful where the shade is the deepest; and either in these, or the blue eyes, the fire, which gives its finest expression to the eye, is more distinguishable in proportion to the darkness of the tint. For this reason, the black eyes, as they are called, have the greatest vivacity; but, probably, the blue have the most powerful effect in beauty, as they reflect a greater variety of lights, being composed of more various colours.

This variety, which is found in the colour of the eyes, is peculiar to man, and one or two other kinds of animals; but, in general, the colour in any one individual is the same in all the rest. The eyes of oxen are brown; those of sheep of a water colour; those of goats are grey; "and it may also be, in general, remarked, that the eyes of most white animals are red; thus the rabbit, the ferret, and, in the human race, the white Moor, all have their eyes of a red colour."

Although the eye, when put into motion,

seems to be drawn on one side; yet it only moves round its centre; by which its coloured part moves nearer, or farther from the angle of the eye-lids, or is elevated or depressed. The distance between the eyes is less in man than in any other animal; and in some of them it is so great that it is impossible that they should ever view the same object with both eyes at once, unless it be very far off. "This, however, in them, is rather an advantage than an inconvenience; as they are thus able to watch round them, and guard against the dangers of their precarious situation."

Next to the eyes, the features, which most give a character to the face, are the eye-brows; which being, in some measure, more apparent than the other features, are most readily distinguished at a distance. "Le Brun, in giving a painter directions, with regard to the passions, places the principal expression of the face in the eye brows. From their elevation and depression, most of the furious passions are characterized; and such as have this feature extremely moveable, are usually known to have an expressive face. By means of these we can imitate all the other passions, as they are raised and depressed, at command; the rest of the features are generally fixed; or, when put into motion,

motion, they do not obey the will ; the mouth and eyes, in an actor, for instance, may, by being violently distorted, give a very different expression from what he would intend ; but the eye-brows can scarcely be exerted improperly ; their being raised, denotes all those passions which pride, or pleasure inspire ; and their depression marks those which are the effects of contemplation and pain ; and such who have this feature, therefore, most at command, are often found to excel as actors."

The eye-lashes have an effect, in giving expression to the eye, particularly when long and close ; they soften its glances, and improve its sweetness. Man and apes are the only animals that have eye-lashes both upon the upper and lower lids ; all other animals want them on the lid below.

The eye-lids serve to guard the ball of the eye, and to furnish it with a proper moisture. The upper lid rises and falls ; the lower has scarce any motion ; and although their being moved depends on the will, yet it often happens that the will is unable to keep them open, when sleep, or fatigue, oppresses the mind. In birds, and amphibious quadrupedes, the lower lid alone has motion ; fishes and insects have no eye-lids whatsoever.

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The forehead makes a large part of the face, and a part which chiefly contributes to its beauty. It ought to be justly proportioned; neither too round nor too flat; neither too narrow nor too low; and the hair should come thick upon its extremities. It is known to every body how much the hair tends to improve the face; and how much the being bald serves to take away from beauty. The highest part of the head is that which becomes bald the soonest, as well as that part which lies immediately above the temples. The hair under the temples, and at the back of the head, is very seldom known to fail, “and women are much less apt to become bald than men; Mr. Buffon seems to think they never become bald at all; but we have too many instances of the contrary among us, not very easily to contradict the assertion. Of all parts, or appendages of the body, the hair is that which is found most different, in different climates; and often not only contributes to mark the country, but also the disposition of the man. It is, in general, thickest where the constitution is strongest; and more glossy and beautiful where the health is most permanent. The ancients held the hair to be a sort of excrement, produced like the nails; the part next the root pushing out that immediately

immediately contiguous. But the moderns have found that every hair may be truly said to live, to receive nutriment, to fill and distend itself like the other parts of the body. The roots, they observe, do not turn grey sooner than the extremities, but the whole hair changes colour at once; and we have many instances of persons who have grown grey in one night's time. * Each hair, if viewed with a microscope, is found to consist of five or six lesser ones, all wrapped up in one common covering; it appears knotted, like some sorts of grass, and sends forth branches at the joints. It is bulbous at the root, by which it imbibes its moisture from the body, and it is split at the points; so that a single hair, at its end, resembles a brush. Whatever be the size, or the shape of the pore, through which the hair issues, it accommodates itself to the same; being either thick, as they are large; small, as they are less; round, triangular, and variously formed as the pores happen to be various. The hair takes its colour from the juices flowing through it; and it is found that this colour differs in different tribes and races of people. The Americans, and the Asiatics, have their hair black,

* Mr. Buffon says that the hair begins to grow grey at the points, but the fact is otherwise.

black, thick, straight, and shining. The inhabitants of the torrid climates of Africa, have it black, short, and woolly. The people of Scandinavia have it red, long, and curled; and those of our own, and the neighbouring countries, are found with hair of various colours. However, it is supposed by many, that every man resembles in his disposition the inhabitants of those countries whom he resembles in the colour, and the nature of his hair; so that the black are said, like the Asiatics, to be grave and acute; the red, like the Gothic nations, to be cholerick and bold. However this may be, the length and the strength of the hair is a general mark of a good constitution; and as that hair which is strongest is most commonly curled, so curled hair is generally regarded among us as a beauty. The Greeks, however, had a very different idea of beauty, in this respect; and seem to have taken one of their peculiar national distinctions from the length and the straightness of the hair."

The nose is the most prominent feature in the face; but, as it has scarce any motion, and that only in the strongest passions, it rather adds to the beauty than to the expression of the countenance. "However, I am told, by the skilful in this branch of knowledge, that wide nostrils add a great deal

deal to the bold and resolute air of the countenance; and where they are narrow, though it may constitute beauty, it seldom improves expression." The form of the nose, and its advanced position, are peculiar to the human visage alone. Other animals, for the most part, have nostrils, with a partition between them; but none of them have an elevated nose. Apes themselves have scarce any thing else of this feature, but the nostrils; the rest of the feature lying flat upon the visage, and scarce higher than the cheek bones. "Among all the tribes of savage men also, the nose is very flat; and I have seen a Tartar who had scarce any thing else but two holes through which to breathe."

The mouth and lips, next to the eyes, are found to have the greatest expression. The passions have great power over this part of the face; and the mouth marks its different degrees, by its different forms. The organ of speech still more animates this part, and gives it more life than any other feature in the countenance. The ruby colour of the lips, and the white enamel of the teeth, give it such a superiority over every other feature, that it seems to make the principal object of our regards. In fact, the whole attention is fixed upon the lips of
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the speaker; however rapid his discourse, however various the subject, the mouth takes correspondent situations; and deaf men have been often found to see the force of those reasonings which they could not hear, understanding every word as it was spoken.

“ The under jaw in man possesses a great variety of motions; while the upper has been thought, by many, to be quite immoveable.* However, that it moves in man, a very easy experiment will suffice to convince us. If we keep the head fixed, with any thing between our teeth, the edge of a table for instance, and then open our mouths, we shall find that both jaws recede from it at the same time; the upper jaw rises, and the lower falls, and the table remains untouched between them. The upper jaw, therefore, has motion as well as the under; and, what is remarkable, it has its proper muscles behind the head, for thus raising and depressing it. Whenever, therefore, we eat, both jaws move at the same time, though very unequally; for the whole head moving with the upper jaw, of which it makes a part, its motions are thus less

* Mr. Buffon is of this opinion. He says, that the upper jaw is immoveable in all animals whatsoever. However, the parrot is an obvious exception; and so is man himself, as shewn above.

less observable." In the human embryo, the under jaw is very much advanced before the upper. "In the adult, it hangs a good deal more backward; and those whose upper and under row of teeth are equally prominent, and strike directly against each other, are what the painters call underhung; and they consider this as a great defect in beauty.* The under jaw in a Chinese face falls greatly more backward than with us; and, I am told, the difference is half an inch, when the mouth is shut naturally." In instances of the most violent passion, the under jaw has often an involuntary quivering motion; and often also, a state of languor produces another, which is that of yawning. "Every one knows how very sympathetic this kind of languid motion is; and that for one person to yawn, is sufficient to set all the rest of the company yawning. A ridiculous instance of this was commonly practised upon the famous M'Laurin, one of the professors at Edinburgh. He was very subject to have his jaw dislocated; so that when he opened his mouth wider than ordinary, or when he yawned, he could not shut it again. In the midst of his harangues, therefore, if any of his

* Mr. Buffon says, that both jaws, in a perfect face, should be on a level: but this is denied by the best painters.

his pupils began to be tired of his lecture, he had only to gape or yawn, and the professor instantly caught the sympathetic affection ; so that he thus continued to stand speechless, with his mouth wide open, till his servant, from the next room, was called in to set his jaw again."

When the mind reflects with regret upon some good unattained or lost, it feels an internal emotion, which acting upon the diaphragm, and that upon the lungs, produces a sigh ; this, when the mind is strongly affected, is repeated ; sorrow succeeds these first emotions ; and tears are often seen to follow : sobbing is the sigh still more invigorated ; and lamentation, or crying, proceeds from the continuance of the plaintive tone of the voice, which seems to implore pity. " There is yet a silent agony, in which the mind appears to disdain all external help, and broods over its distresses with gloomy reserve. This is the most dangerous state of mind ; accidents or friendship may lessen the louder kinds of grief ; but all remedies for this, must be had from within : and there, despair too often finds the most deadly enemy."

Laughter is a sound of the voice, interrupted and pursued for some continuance. The muscles of the belly, and the diaphragm, are employed

ployed in its slightest exertions ; but those of the ribs are strongly agitated in the louder : and the head sometimes is thrown backward, in order to raise them with greater ease. The smile is often an indication of kindness and good-will : it is also often used as a mark of contempt and ridicule.

Blushing proceeds from different passions ; being produced by shame, anger, pride, and joy. Paleness is often also the effect of anger ; and almost ever attendant on fright and fear. These alterations in the colour of the countenance, are entirely involuntary ; all the other expressions of the passions are, in some small degree, under controul ; but blushing and paleness, betray our secret purposes ; and we might as well attempt to stop them, as the circulation of the blood, by which they are caused.

The whole head, as well as the features of the face, takes peculiar attitudes from its passions ; it bends forward, to express humility, shame, or sorrow ; it is turned to one side, in languor, or in pity ; it is thrown with the chin forward, in arrogance and pride ; erect, in self-conceit, and obstinacy ; it is thrown backwards in astonishment ; and combines its motions to the one side, and the other, to express contempt, ridicule, anger, and resentment. “ Painters, whose study leads to the contemplation

tion of external forms, are much more adequate judges of these than any naturalist can be ; and it is with these a general remark, that no one passion is regularly expressed on different countenances in the same manner ; but that grief often sits upon the face like joy ; and pride assumes the air of passion. It would be vain, therefore, in words, to express their general effect, since they are often as various as the countenances they sit upon ; and in making this distinction nicely, lies all the skill of the physiognomist. In being able to distinguish what part of the face is marked by nature, and what by the mind ; what part has been originally formed, and what is made by habit, constitutes this science ; upon which the ancients so much valued themselves, and which we at present so little regard. Some, however, of the most acute men among us, have paid great attention to this art ; and, by long practice, have been able to give some character of every person whose face they examined. Montaigne is well known to have disliked those men who shut one eye in looking upon any object : and Fielding asserts, that he never knew a person with a steady glavering smile, but he found him a rogue. However, most of these observations, tending to a discovery of the
mind

mind by the face, are merely capricious ; and Nature has kindly hid our hearts from each other, to keep us in good humour with our fellow creatures."

The parts of the head which give the least expression to the face, are the ears ; and they are generally found hidden under the hair. These, which are immoveable, and make so small an appearance in man, are very distinguishing features in quadrupeds. They serve in them as the principal marks of the passions ; the ears discover their joys or their terrors, with tolerable precision ; and denote all their internal agitations. The smallest ears, in men, are said to be most beautiful ; but the largest are found the best for hearing. There are some savage nations who bore their ears, and so draw that part down, that the tips of the ears are seen to rest upon their shoulders.

The strange variety in the different customs of men, appears still more extravagant in their manner of wearing their beards. Some, and among others the Turks, cut the hair off their heads, and let their beards grow. The Europeans, on the contrary, shave their beards, and wear their hair. The Negroes shave their heads in figures at one time, in stars at another, in the manner of friars ; and still more commonly in alternate stripes ;

stripes ; and their little boys are shaved in the same manner. The Talapoins, of Siam shave the heads and the eye-brows of such children as are committed to their care. Every nation seems to have entertained different prejudices, at different times, in favour of one part or another of the beard. Some have admired the hair upon the cheeks on each side, as we see with some low-bred men among ourselves, who want to be fine. Some like the hair lower down ; some chuse it curled ; and others like it strait. " Some have cut it into a peak ; and others shave all but the whisker. This particular part of the beard was highly prized among the Spaniards ; till of late, a man without whiskers was considered as unfit for company ; and where Nature had denied them, Art took care to supply the deficiency. We are told of a Spanish general who, when he borrowed a large sum of money from the Venetians, pawned his whisker, which he afterwards took proper care to release. Kingdon assures us, that a considerable part of the religion of the Tartars consists in the management of their whiskers ; and that they waged a long and bloody war with the Persians, declaring them infidels, merely because they would not give their whiskers the orthodox cut. The kings of Persia carried the care of their beards
to

to a ridiculous excess, when they chose to wear them matted with gold thread: and the kings of France themselves, of the first races, had them knotted and buttoned with gold. But of all nations, the Americans take the greatest pains in cutting their hair, and plucking their beards. The under part of the beard, and all but the whisker, they take care to pluck up by the roots, so that many have supposed them to have no hair naturally growing on that part: and even Linnæus himself has fallen into that mistake. Their hair is also cut into bands; and no small care employed in adjusting the whisker. In fact, we have a very wrong idea of savage finery; and are apt to suppose that, like the beasts of the forest, they rise, and are dressed with a shake: but the reverse is true; for no birth-night beauty takes more time or pains in the adorning her person, than they. I remember, when the Cherokee kings were over here, that I have waited for three hours, during the time they were dressing. They never would venture to make their appearance till they had gone through the tedious ceremonies of the toilet; they had their boxes of oil and oker, their fat, and their perfumes, like the most effeminate beau, and generally took up four hours in dressing, before they con-

sidered themselves as fit to be seen. We must not, therefore, consider a delicacy in point of dress, as a mark of refinement, since savages are much more difficult in this particular, than the most fashionable or tawdry European. The more barbarous the people, the fonder of finery. In Europe, the lustre of jewels, and the splendor of the most brilliant colours, are generally given up to women, or to the weakest part of the other sex, who are willing to be contemptibly fine: but in Asia, these trifling fineries are eagerly sought after by every condition of men; and, as the proverb has it, we find the richest jewels in an *Æthiop's* ear. The passion for glittering ornaments, is still stronger among the absolute barbarians, who often exchange their whole stock of provisions, and whatever else they happen to be possessed of, with our seamen, for a glass bead, or a looking-glass."

Although fashions have arisen in different countries from fancy and caprice, these, when they become general, deserve examination. Mankind have always considered it as a matter of moment, and they will ever continue desirous of drawing the attention of each other, by such ornaments as mark the riches, the power, or the courage of the wearer. The value of those shining stones which have at all times been considered as
precious

precious ornaments, is entirely founded upon their scarceness or their brilliancy. It is the same likewise, with respect to those shining metals, the weight of which is so little regarded, when spread over our cloaths. These ornaments are rather designed to draw the attention of others, than to add to any enjoyments of our own; and few there are that these ornaments will not serve to dazzle, and who can coolly distinguish between the metal and the man.

All things rare and brilliant, will, therefore, ever continue to be fashionable, while men derive greater advantages from opulence than virtue; while the means of appearing considerable, are more easily acquired, than the title to be considered. The first impression we generally make, arises from our dress; and this varies, in conformity to our inclinations, and the manner in which we desire to be considered. The modest man, or he who would wish to be thought so, desires to shew the simplicity of his mind, by the plainness of his dress; the vain man, on the contrary, takes a pleasure in displaying his superiority, "and is willing to incur the spectator's dislike, so he does but excite his attention."

Another point of view which men have in dressing, is to increase the size of their

figure; and to take up more room in the world than Nature seems to have allotted them. We desire to swell out our cloaths by the stiffness of art, and raise our heels, while we add to the largeness of our heads. How bulky soever our dress may be, our vanities are still more bulky. The largeness of the doctor's wig arises from the same pride with the smallness of the beau's queue. Both want to have the size of their understanding measured by the size of their heads.

There are some modes that seem to have a more reasonable origin, which is to hide or to lessen the defects of Nature. To take men altogether, there are many more deformed and plain, than beautiful and shapely. The former, as being the most numerous, give law to fashion; and their laws are generally such as are made in their own favour. The women begin to colour their cheeks with red, when the natural roses are faded; and the younger are obliged to submit, though not compelled by the same necessity. In all parts of the world, this custom prevails more or less; and powdering and frizzing the hair, though not so general, seems to have arisen from a similar control.

But leaving the draperies of the human picture, let us return to the figure, undorned

dorned by art. Man's head, whether considered externally or internally, is differently formed from that of all other animals, the monkey-kind only excepted, in which there is a striking similitude. There are some differences, however, which we shall take notice of in another place. The bodies of all quadrupede animals are covered with hair; but the head of man seems the part most adorned; and that more abundantly than in any other animal.

There is a very great variety in the teeth of all animals; some have them above and below; others have them in the under jaw only: in some they stand separate from each other; while in some they are continued and united. The palate of some fishes is nothing else but a bony plate studded with points, which perform the offices of teeth. All these substances, in every animal, derive their origin from the nerves; the substance of the nerves hardens by being exposed to the air; and the nerves that terminate in the mouth, being thus exposed, acquire a bony solidity. In this manner, the teeth and nails are formed in man; and in this manner also, the beak, the hoofs, the horns, and the talons of other animals, are found to be produced.

The neck supports the head, and unites it to the body. This part is much more

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considerable in the generality of quadrupedes, than in man. But fishes, and other animals that want lungs similar to ours, have no neck whatsoever. Birds, in general, have the neck longer than any other kind of animals: those of them, which have short claws, have also short necks; those, on the contrary, that have them long, are found to have the neck in proportion. "In men, there is a lump upon the wind-pipe, formed by the thuroid cartilage, which is not to be seen in women; an Arabian fable says, that this is a part of the original apple, that has stuck in the man's throat by the way, but that the woman swallowed her part of it down."

The human breast is outwardly formed in a very different manner from that of other animals. It is larger in proportion to the size of the body; and none but man, and such animals as make use of their fore feet as hands, such as monkies, bats, and squirrels, are found to have those bones called the clavicles, or, as we usually term them, the collar-bones*. The breasts in women are larger than in men; however, they seem formed in the same manner; and, sometimes, milk is found in the breasts of men,

* Mr. Buffon says, that none but monkeys have them: but this is an oversight.

men, as well as in those of women. Among animals, there is a great variety in this part of the body. The teats of some, as in the ape and the elephant, are like those of men, being but two, and placed on each side of the breast. The teats of the bear amount to four. The sheep has but two, placed between the hinder legs. Other animals, such as the bitch, and the sow, have them all along the belly; and, as they produce many young, they have a great many teats for their support. The form also of the teats, varies in different animals; and, in the same animal, at different ages. The bosom in females, seems to unite all our ideas of beauty, where the outline is continually changing, and the gradations are soft and regular.

“ The graceful fall of the shoulders, both in man and woman, constitute no small part of beauty. In apes, though otherwise made like us, the shoulders are high, and drawn up on each side towards the ears. In man they fall by a gentle declivity; and the more so, in proportion to the beauty of his form. In fact, being high shouldered, is not without reason considered as a deformity, for we find very sickly persons are always so; and people, when dying, are ever seen with their shoulders drawn up in a surprizing manner. The muscles that
serve

serve to raise the ribs, mostly rise near the shoulders; and the higher we raise the shoulders, we the more easily raise the ribs likewise. It happens, therefore, in the sickly and the dying, who do not breathe without labour, that to raise the ribs, they are obliged to call in the assistance of the shoulders; and thus their bodies assume, from habit, that form which they are so frequently obliged to assume. Women with child also, are usually seen to be high shouldered; for the weight of the inferior parts drawing down the ribs, they are obliged to use every effort to elevate them, and thus they raise the shoulders of course. During pregnancy also, the shape, not only of the shoulders, but also of the breast, and even the features of the face, are greatly altered: for the whole upper fore-part of the body is covered with a broad thin skin, called the myoides; which being, at that time, drawn down, it draws down with it the skin, and, consequently, the features of the face. By this means, the visage takes a particular form; the lower eye-lids, and the corners of the mouth, are drawn downwards; so that the eyes are enlarged, and the mouth lengthened; and women, in these circumstances, are said, by the midwives, to be all mouth and eyes."

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The arms of men but very little resemble the fore feet of quadrupedes, and much less the wings of birds. The ape is the only animal that is possessed of hands and arms; but these are much more rudely fashioned, and with less exact proportion than in men; "the thumb not being so well opposed to the rest of the fingers, in their hands, as in ours."

The form of the back is not much different in man from that of other quadrupede animals, only that the reins are more muscular in him, and stronger. The buttock, however, in man, is different from that of all other animals whatsoever. What goes by that name, in other creatures, is only the upper part of the thigh: man being the only animal that supports himself perfectly erect, the peculiar largeness of this part is owing to the peculiarity of his position.

Man's feet, also, are different from those of all other animals, those even of apes not excepted. The foot of the ape is rather a kind of awkward hand; its toes, or rather fingers, are long, and that of the middle longest of all. This foot also wants the heel, as in man; the sole also is narrower, and less adapted to maintain the equilibrium of the body in walking, dancing, or running.

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The nails are less in man than in any other animal. If they were much longer than the extremities of the fingers, they would rather be prejudicial than serviceable, and obstruct the management of the hand. Such savages as let them grow long make use of them in fleaing animals, in tearing their flesh, and such like purposes; however, though their nails are considerably larger than ours, they are by no means to be compared to the hoofs, or the claws of other animals. "They may sometimes be seen longer, indeed, than the claws of any animal whatsoever; as we learn that the nails of some of the learned men in China are longer than their fingers. But these want that solidity which might give force to their exertions; and could never, in a state of nature, have served them for annoyance, or defence."

There is little known exactly with regard to the proportion of the human figure; and the beauty of the best statues is better conceived by observing than by measuring them. "The statues of antiquity, which were at first copied after the human form, are now become the models of it; nor is there one man found whose person any way approaches to those inimitable performances that have thus, in one figure, united the perfections of many. It is sufficient to say that,

that, from being at first models, they are now become originals; and are used to correct the deviations in that form from whence they were taken." I will not, however, pretend to give the proportions of the human body as taken from these, there being nothing more arbitrary, and which good painters themselves so much condemn. Some, for instance, who have studied after these, divide the body into ten times the length of the face, and others into eight. Some pretend to tell us that there is a similitude of proportion in different parts of the body. Thus, that the hand is the length of the face; the thumb the length of the nose; the space between the eyes is the breadth of an eye; that the breadth of the thigh, at thickest, is double that of the thickest part of the leg, and treble the smallest; that the arms extended are just as long as the figure is high; that the legs and thighs are just half the length of the figure. All this, however, is extremely arbitrary; and the excellence of a shape, or the beauty of a statue, results from the attitude and position of the whole, rather than any established measurements, begun without experience, and adopted by caprice. In general, it may be remarked that the proportions alter in every age, and are obviously different in the two sexes. In woman, the shoulders are narrower, and the neck proportionably longer

longer than in men. The hips also are considerably larger, and the thighs much shorter than in men. These proportions, however, vary greatly at different ages. In infancy the upper parts of the body are much larger than the lower; the legs and thighs do not constitute any thing like half the height of the whole figure; in proportion as the child encreases in age, the inferior parts are found to lengthen; so that the body is not equally divided until it has acquired its full growth.

The size of men varies considerably. Men are said to be tall who are from five feet eight inches to six feet high. The middle stature is from five feet five to five feet eight: and those are said to be of small stature who fall under these measures. "However, it ought to be remarked, that the same person is always taller when he rises in the morning, than upon going to bed at night; and sometimes there is an inch difference; and I have seen more. Few persons are sensible of this remarkable variation; and, I am told, it was first perceived, in England, by a recruiting officer. He often found that those men whom he had enlisted for soldiers, and answered to the appointed standard at one time, fell short of it when they came to be measured before the colonel, at the head quarters.

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This diminution in their size proceeded from the different times of the day, and the different states of the body when they happened to be measured. If, as was said, they were measured in the morning, after the night's refreshment, they were found to be commonly half an inch, and very often a whole inch taller than if measured after the fatigues of the day; if they were measured when fresh, in the country, and before a long fatiguing march to the regiment, they were found to be an inch taller than when they arrived at their journey's end. All this is now well known among those who recruit for the army; and the reason of this difference of stature is obvious. Between all the joints of the back-bone, which is composed of several pieces, there is a glutinous liquor deposited, which serves, like oil in a machine, to give the parts an easy play upon each other. This lubricating liquor, or synovia, as the anatomists call it, is poured in during the season of repose, and is consumed by exercise and employment; so that in a body, after hard labour, there is scarce any of it remaining; but all the joints grow stiff, and their motion becomes hard and painful. It is from hence, therefore, that the body diminishes in stature. For this moisture being drained away, from between the numerous joints of the back-

back-bone, they lie cloſer upon each other ; and their whole length is thus very ſenſibly diminiſhed ; but ſleep once more, by reſtoring the fluid, again ſwells the ſpaces between the joints, and the whole is extended to its former dimenſions.

“ As the human body is thus often found to differ from itſelf in ſize, ſo it is found to differ in its weight alſo ; and the ſame perſon, without any apparent cauſe, is found to be heavier at one time than another. If, after having eat an hearty dinner, or having drank hard, the perſon ſhould find himſelf thus heavier, it would appear no way extraordinary ; but the fact is, the body is very often found heavier ſome hours after eating an hearty meal, than immediately ſucceeding it. If, for inſtance, a perſon, fatigued by a day's hard labour, ſhould eat a plentiful ſupper, and then get himſelf weighed upon going to bed ; after ſleeping ſoundly, if he is again weighed, he will find himſelf conſiderably heavier than before ; and this difference is often found to amount to a pound, or ſometimes to a pound and a half. From whence this adventitious weight is derived is not eaſy to conceive ; the body, during the whole night, appears rather plentifully perſpiring than imbibing any fluid, rather loſing than gaining moiſture :
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however, we have no reason to doubt but that either by the lungs, or, perhaps, by a peculiar set of pores, it is all this time inhaling a quantity of fluid, which thus encreases the weight of the whole body, upon being weighed the next morning." *

Although the human body is externally more delicate than any of the quadrupede kind, it is, notwithstanding, extremely muscular: and, perhaps, for its size, stronger than that of any other animal whatsoever. If we should offer to compare the strength of the lion with that of man, we should consider that the claws of this animal give us a false idea of its power; we ascribe to its force what is only the effects of its arms. Those which man has received from Nature are not offensive; happy had art never furnished him with any more terrible than those which arm the paws of the lion.

But there is another manner † of comparing the strength of man with that of other animals; namely, by the weights which either can carry. We are assured that

* From this experiment also, the learned may gather upon what a weak foundation the whole doctrine of Sanctorian perspiration is built: but this disquisition more properly belongs to medicine than natural history.

† Mr. Buffon calls it a better manner, but this is not the case.

that the porters of Constantinople, carry burthens of nine hundred pounds weight : Mr. Defaguliers tells us of a man, who, by distributing weights in such a manner as that every part of his body bore its share, he was thus able to raise a weight of two thousand pounds. An horse, which is about seven times our bulk, would be thus able to raise a weight of fourteen thousand pounds, if its strength were in the same proportion.* “ But, the truth is, an horse will not carry upon its back, above a weight of two or three hundred pounds ; while a man, of confessedly inferior strength, is thus able to support two thousand. Whence comes this seeming superiority ? The answer is obvious. Because the load upon man’s shoulders is placed to the greatest advantage ; while, upon the horse’s back, it is placed at the greatest disadvantage. Let us suppose, for a moment, the man standing as upright as possible, under the great load abovementioned. It is obvious that all the bones of his body may be compared to a pillar supporting a building, and that his muscles have scarce any share in this dangerous duty. However, they are not entirely inactive ; as man, let him stand ever so upright, will have

* Mr. Buffon carries this subject no farther ; and thus far, without explanation, it is erroneous.

have some bending in the different parts of his body. The muscles, therefore, give the bones some assistance, and that with the greatest possible advantage. In this manner, therefore, a man has been found to support two thousand weight; but may be capable of supporting a still greater. The manner in which this is done, is by strapping the load round the shoulders of the person, who is to bear it by a machine, something like that by which milk vessels, or water-buckets are carried. The load being thus placed on a scaffold, on each side, contrived for that purpose, and the man standing erect in the midst, all parts of the scaffold, except that where the man stands, are made to sink; and thus the man maintaining his position, the load, whatever it is, becomes suspended, and the column of his bones may be fairly said to support it. If, however, he should but ever so little give way, he must inevitably drop; and no power of his can raise the weights again. But the case is very different with regard to a load laid upon an horse. The column of the bones there lies a different way; and a weight of five hundred pounds, as I am told, would break the back of the strongest horse that could be found. The great force of an horse, and other quadrupedes, is ex-

erted when the load is in such a position as that the column of the bones can be properly applied ; which is lengthwise. When, therefore, we are to estimate the comparative strength of an horse, we are not to try what he can carry, but what he can draw ; and, in this case, his amazing superiority over man is easily discerned ; for one horse can draw a load that ten men cannot move. And in some cases it happens that a draft horse draws the better for being somewhat loaded ; for, as the peasants say, the load upon his back keeps him the better to the ground."

There is still another way of estimating human strength by the perseverance and agility of our motions. Men, who are exercised in running, outstrip horses ; or at least hold their speed for a longer continuance. In a journey, also, a man will walk down a horse ; and after they have both continued to proceed for several days, the horse will be quite tired, and the man will be fresher than in the beginning. The king's messengers of Ispahan, who are runners by profession, go thirty-six leagues in fourteen hours. Travellers assure us that the Hottentots outstrip lions in the chase ; and that the savages, who hunt the elk, pursue with such speed, that they at last tire down, and take

take it. We are told many very surprizing things of the great swiftness of the savages, and of the long journeys they undertake, on foot, through the most craggy mountains, where there are no paths to direct, nor houses to entertain them. They are said to perform a journey of twelve hundred leagues in less than six weeks. "But, notwithstanding what travellers report of this matter, I have been assured, from many of our officers, and soldiers, who compared their own swiftness with that of the native Americans, during the last war, that although the savages held out, and, as the phrase is, had better bottom, yet, for a spurt, the Englishmen were more nimble and speedy."

Nevertheless, in general, civilized man is ignorant of his own powers; he is ignorant how much he loses by effeminacy; and what might be acquired by habit and exercise. Here and there, indeed, men are found among us of extraordinary strength; but that strength, for want of opportunity, is seldom called into exertion. "Among the ancients it was a quality of much greater use than at present; as in war the same man that had strength sufficient to carry the heaviest armour, had strength sufficient also to strike the most fatal blow. In this case, his strength was at once his protection and

his power. We ought not to be surprized, therefore, when we hear of one man terrible to an army, and irresistible in his career, as we find some generals represented in ancient history. But we may be very certain that this prowess was exaggerated by flattery, and exalted by terror. An age of ignorance is ever an age of wonder. At such times, mankind, having no just ideas of the human powers, are willing rather to represent what they wish than what they know; and exalt human strength, to fill up the whole sphere of their limited conceptions. Great strength is an accidental thing; two, or three, in a country, may possess it; and these may have a claim to heroism. But what may lead us to doubt of the veracity of these accounts is, that the heroes of antiquity are represented as the sons of heroes; their amazing strength is delivered down from father to son; and this we know to be contrary to the course of nature. Strength is not hereditary; although titles are: and I am very much induced to believe, that this great tribe of heroes, who are all represented as the descendants of heroes, are more obliged to their titles than to their strength, for their characters. With regard to the shining characters in Homer, they are all represented as princes, and as the sons of princes; while we are told of
scarce

scarce any share of prowess whatsoever in the meaner men of the army ; who are only brought into the field for these to protect, or to slaughter. But nothing can be more unlikely than that those men, who were bred in the luxury of courts, should be strong ; while the whole body of the people, who received a plainer and simpler education, should be comparatively weak. Nothing can be more contrary to the general laws of nature, than that all the sons of heroes should thus inherit not only the kingdoms, but the strength of their forefathers ; and we may conclude, that they owe the greatest share of their imputed strength rather to the dignity of their stations than the force of their arms ; and, like all fortunate princes, their flatterers happened to be believed. In later ages, indeed, we have some accounts of amazing strength, which we can have no reason to doubt of. But in these, nature is found to pursue her ordinary course ; and we find their strength accidental. We find these strong men among the lowest of the people, and gradually rising into notice, as this superiority had more opportunity of being seen. Of this number was the Roman tribune, who went by the name of the second Achilles ; who, with his own hand, killed, at different times, three hundred of
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the enemy ; and when treacherously set upon, by twenty-five of his own countrymen, although then past his sixtieth year, killed fourteen of them before he was slain. Of this number was Milo, who, when he stood upright, could not be forced out of his place. Pliny, also, tells of one Athanatus, who walked across the stage at Rome, loaded with a breast plate weighing five hundred pounds, and buskins of the same weight. But of all the prodigies of strength, of whom we have any accounts in Roman history, Maximin, the emperor, is to be reckoned the foremost. Whatever we are told relative to him is well attested ; his character was too exalted not to be thoroughly known ; and that very strength, for which he was celebrated, at last procured him no less a reward than the empire of the world. Maximin was above nine feet in height, and the best proportioned man in the whole empire. He was by birth a Thracian ; and, from being a simple herdsman, rose through the gradations of office, until he came to be Emperor of Rome. The first opportunity he had of exerting his strength, was in the presence of all the citizens, in the theatre, where he overthrew twelve of the strongest men, in wrestling, and outstript two of the fleetest horses, in running, all in one

one day. He could draw a chariot loaden, that two strong horses could not move; he could break a horse's jaw with a blow of his fist; and its thigh with a kick. In war he was always foremost, and invincible; happy had it been for him, and his subjects, if, from being formidable to his enemies, he had not become still more so to his subjects; he reigned, for some time, with all the world his enemy; all mankind wishing him dead, yet none daring to strike the blow. As if fortune had resolved that through life he should continue unconquerable, he was killed at last by his own soldiers, while he was sleeping. We have many other instances, in later ages, of very great strength, and not fewer of amazing swiftness; but these, merely corporeal perfections, are now considered as of small advantage, either in war or in peace. The invention of gunpowder has, in some measure, levelled down all force to one standard; and has wrought a total change in human education through all parts of the world. In peace also, the invention of new machines every day, and the application of the strength of the lower animals to the purposes of life, have rendered human strength less valuable. The boast of corporeal force is now therefore, consigned to savage nations, where those arts
not

not being introduced, it may still be needful; but, in more polite countries, few will be proud of that strength which other animals can be taught to exert to as useful purposes as they.

“If we compare the largeness and thickness of our muscles with those of any other animal, we shall find that, in this respect, we have the advantage; and if strength, or swiftness, depended upon the quantity of muscular flesh alone, I believe that, in this respect, we should be more active and powerful than any other. But this is not the case; a great deal more than the size of the muscles goes to constitute activity, or force; and it is not he who has the thickest legs that can make the best use of them. Those, therefore, who have written elaborate treatises on muscular force, and have estimated the strength of animals by the thickness of their muscles, have been employed to very little purpose. It is, in general, observed that thin and raw-boned men are always stronger and more powerful than such as are seemingly more muscular; as in the former all the parts have better room for their exertions.”

Women want much of the strength of men; and, in some countries, the stronger sex have availed themselves of this superiority,

ority, in cruelly and tyrannically enslaving those who were made with equal pretensions to a share in all the advantages life can bestow. Savage nations oblige their women to a life of continual labour; upon them rests all the drudgeries of domestic duty; while the husband, indolently reclined in his hammock, is first served from the fruits of her industry. From this negligent situation he is seldom roused, except by the calls of appetite, when it is necessary, either by fishing or hunting, to make a variety in his entertainments. A savage has no idea of taking pleasure in exercise; he is surprized to see an European walk forward for his amusement, and then return back again. As for his part he could be contented to remain for ever in the same situation, perfectly satisfied with sensual pleasures and undisturbed repose. The women, therefore, of these countries, are the greatest slaves upon earth; sensible of their weakness, and unable to resist, they are obliged to suffer those hardships which are naturally inflicted by such as have been taught that nothing but corporeal force ought to give pre-eminence. It is not, therefore, till after some degree of refinement, that women are treated with lenity; and not till the highest degree of politeness, that

that they are permitted to share in all the privileges of man. The first impulse of savage nature is to confirm their slavery; the next, of half barbarous nations, is to appropriate their beauty; and that, of the perfectly polite, to engage their affections. In civilized countries, therefore, women have united the force of modesty to the power of their natural charms; and thus obtain that superiority over the mind, which they are unable to extort by their strength.



C H A P. VI.

Of Sleep and Hunger.

AS man, in all the privileges he enjoys, and the powers he is invested with, has a superiority over all other animals, so, in his necessities, he seems inferior to the meanest of them all. Nature has brought him into life with a greater variety of wants and infirmities, than the rest of her creatures, unarmed in the midst of enemies. The lion has natural arms; the bear natural cloathing; but man is destitute of all such advantages; and, from the superiority of his mind alone, he is to supply the deficiency. The number of his wants, however, were merely given, in order to multiply the number of his enjoyments; since the possibility of being deprived of any good, teaches him the value of its possession. Were man born with those advantages which he learns to possess by industry, he would very probably enjoy them with a blunter relish: it is by being naked, that he knows the value of a covering; it is by being exposed to the weather, that he learns the comforts of an habitation. Every want thus becomes a means of pleasure, in the redressing; and that animal that has most desires, may be
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said to be capable of the greatest variety of happiness.

Beside the thousand imaginary wants peculiar to man only, there are two, which he has in common with all other animals, and which he feels in a more necessary manner than they. These are the wants of sleep and hunger. Every animal that we are acquainted with, seems to endure the want of these with much less injury to health, than man; and some are most surprisingly patient in sustaining both. The little domestic animals that we keep about us, may often set a lesson of calm resignation, in supporting want and watchfulness, to the boasted philosopher. They receive their pittance at uncertain intervals, and wait its coming with chearful expectation. We have instances of the dog, and the cat, living, in this manner, without food, for several days; and yet still preserving their attachment to the tyrant that oppresses them; still ready to exert their little services for his amusement or defence. But the patience of these is nothing, to what the animals of the forest endure. As these mostly live upon accidental carnage, so they are often known to remain without food for several weeks together. Nature, kindly solicitous for their support, has also contracted their stomachs, to suit them for
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their precarious way of living ; and kindly, while it abridges the banquet, lessens the necessity of providing for it. But the meaner tribes of animals are made still more capable of sustaining life without food, many of them remaining in a state of torpid indifference till their prey approaches, when they jump upon and seize it. In this manner, the snake, or the spider, continue, for several months together, to subsist upon a single meal ; and some of the butterfly kinds actually live upon nothing. But it is very different with man : his wants daily make their importunate demands ; and it is supposed, that he cannot continue to live four days without eating, drinking, and sleeping.

Hunger is a much more powerful enemy to man than watchfulness, and kills him much sooner. It may be considered as a disorder that food removes ; and that would quickly be fatal, without its proper antidote. In fact, it is so terrible to man, that to avoid it he even encounters certain death ; and, rather than endure its tortures, exchanges them for immediate destruction. However, by what I have been told, it is much more dreadful in its approaches, than in its continuance ; and the pains of a famishing wretch, decrease as his strength diminishes. In the beginning, the desire of
food

food is dreadful indeed, as we know by experience, for there are few who have not in some degree felt its approaches. But, after the first or second day, its tortures become less terrible, and a total insensibility at length comes kindly in to the poor wretch's assistance. I have talked with the captain of a ship, who was one of the six that endured it in its extremities; and who was the only person that had not lost his senses, when they received accidental relief. He assured me, his pains at first were so great, as to be often tempted to eat a part of one of the men who died; and which the rest of his crew actually for some time lived upon: he said that, during the continuance of this paroxysm, he found his pains insupportable; and was desirous, at one time, of anticipating that death which he thought inevitable: but his pains, he said, gradually decreased, after the sixth day, (for they had water in the ship, which kept them alive so long) and then he was in a state rather of languor than desire; nor did he much wish for food, except when he saw others eating; and that for a while revived his appetite, though with diminished importunity. The latter part of the time, when his health was almost destroyed, a thousand strange images rose upon his mind; and every one of his senses

senses began to bring him wrong information. The most fragrant perfumes appeared to him to have a foetid smell; and every thing he looked at took a greenish hue, and sometimes a yellow. When he was presented with food by the ship's company, that took him and his men up, four of whom died shortly after, he could not help looking upon it with loathing, instead of desire; and it was not till after four days, that his stomach was brought to its natural tone; when the violence of his appetite returned, with a sort of canine eagerness.

Thus dreadful are the effects of hunger; and yet when we come to assign the cause that produces them, we find the subject involved in doubt and intricacy. This longing eagerness is, no doubt, given for a very obvious purpose; that of replenishing the body, wasted by fatigue and perspiration. Were not men stimulated by such a pressing monitor, they might be apt to pursue other amusements, with a perseverance beyond their power; and forget the useful hours of refreshment, in those more tempting ones of pleasure. But hunger makes a demand that will not be refused; and, indeed, the generality of mankind, seldom await the call.

Hunger has been supposed by some to arise from the rubbing of the coats of the stomach

stomach against each other, without having any intervening substance to prevent their painful attrition. Others have imagined, that its juices, wanting their necessary supply, turn acrid, or, as some say, pungent; and thus fret its internal coats, so as to produce a train of the most uneasy sensations. Boerhaave, who made his reputation in physic, by uniting the conjectures of all those that preceded him, ascribes hunger to the united effect of both these causes; and asserts, that the pungency of the gastric juices, and the attrition of its coats against each other, cause those pains, which nothing but food can remove. These juices continuing still to be separated in the stomach, and every moment becoming more acrid, mix with the blood, and infect the circulation: the circulation being thus contaminated, becomes weaker, and more contracted; and the whole nervous frame sympathizing, an hectic fever, and sometimes madness, is produced; in which state the faint wretch expires. In this manner, the man who dies of hunger, may be said to be poisoned by the juices of his own body; and is destroyed less by the want of nourishment, than by the vitiated qualities of that which he had already taken.

However this may be, we have but few instances of men dying, except at sea, of
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absolute hunger. The decline of those unhappy creatures who are destitute of food, at land, being more slow and unperceived. These, from often being in need, and as often receiving an accidental supply, pass their lives between surfeiting and repining; and their constitution is impaired by insensible degrees. Man is unfit for a state of precarious expectation. That share of provident precaution which incites him to lay up stores for a distant day, becomes his torment, when totally unprovided against an immediate call. The lower race of animals, when satisfied for the instant moment, are perfectly happy: but it is otherwise with man; his mind anticipates distress, and feels the pangs of want even before it arrests him. Thus the mind, being continually harrassed by the situation, it at length influences the constitution, and unfits it for all its functions. Some cruel disorder, but no way like hunger, seizes the unhappy sufferer; so that almost all those men who have thus long lived by chance, and whose every day may be considered as an happy escape from famine, are known at last to die in reality, of a disorder caused by hunger; but which, in the common language, is often called a broken-heart. Some of these I have known myself, when very

little able to relieve them: and I have been told, by a very active and worthy magistrate, that the number of such as die in London for want, is much greater than one would imagine—I think he talked of two thousand in a year.

But how numerous soever those who die of hunger may be, many times greater, on the other hand, are the number of those who die by repletion. It is not the province of the present page to speculate, with the physician, upon the danger of surfeits; or, with the moralist, upon the nauseousness of gluttony: it will only be proper to observe, that as nothing is so prejudicial to health as hunger by constraint, so nothing is more beneficial to the constitution than voluntary abstinence. It was not without reason that religion enjoined this duty; since it answered the double purpose of restoring the health oppressed by luxury, and diminished the consumption of provisions, so that a part might come to the poor. It should be the business of the legislature, therefore, to enforce this Divine precept; and thus, by restraining one part of mankind in the use of their superfluities, to consult for the benefit of those who want the necessaries of life. The injunctions for abstinence are strict over the whole Continent; and were rigorously observed, even among

among ourselves, for a long time after the Reformation. Queen Elizabeth, by giving her commands, upon this head the air of a political injunction, lessened, in a great measure, and, in my opinion, very unwisely, the religious force of the obligation. She enjoined that her subjects should fast from flesh on Fridays and Saturdays ; but at the same time declared, that it was not commanded from motives of religion, as if there were any differences in meats, but merely to favour the consumption of fish, and thus to multiply the number of mariners ; and also to spare the stock of sheep, which might be more beneficial in another way. In this manner the injunction defeated its own force, and this most salutary law became no longer binding, when it was supposed to come purely from man. How far it may be enjoined in the Scriptures, I will not take upon me to say ; but this may be asserted, that if the utmost benefit to the individual, and the most extensive advantage to society, serve to mark any institution as of Heaven, this of abstinence may be reckoned among the foremost.

Were we to give an history of the various benefits that have arisen from this command, and how conducive it has been to long life, the instances would fatigue with their multiplicity. It is surprizing to

what a great age the primitive Christians of the East, who retired from persecution in the deserts of Arabia, continued to live, in all the bloom of health, and yet all the rigours of abstemious discipline. Their common allowance, as we are told, for four and twenty hours, was twelve ounces of bread, and nothing but water. On this simple beverage, St. Anthony is said to have lived an hundred and five years; James, the hermit, an hundred and four; Arsenius, tutor to the emperor Arcadius, an hundred and twenty; St. Epiphanius, an hundred and fifteen; Simeon, an hundred and twelve; and Rombald, an hundred and twenty. In this manner did these holy temperate men live to an extreme old age, kept chearful by strong hopes, and healthful by moderate labour.

Abstinence which is thus voluntary, may be much more easily supported than constrained hunger. Man is said to live without food for seven days; which is the usual limit assigned him: and, perhaps, in a state of constraint, this is the longest time he can survive the want of it. But in cases of voluntary abstinence, of sickness, or sleeping, he has been known to live much longer.

In the records of the Tower, there is an account of a Scotchman, imprisoned for felony,

felony, who, for the space of six weeks, took not the least sustenance, being exactly watched during the whole time; and for this he received the king's pardon.

When the American Indians undertake long journies, and when, consequently, a stock of provisions sufficient to support them the whole way, would be more than they could carry, in order to obviate this inconvenience, instead of carrying the necessary quantity, they contrive a method of palliating their hunger, by swallowing pills, made of calcined shells and tobacco. These pills take away all appetite, by producing a temporary disorder in the stomach; and, no doubt the frequent repetition of this wretched expedient, must at last be fatal. By this means, however, they continue several days without eating, chearfully bearing such extremes of fatigue and watching, as would quickly destroy men bred up in a greater state of delicacy. For those arts by which we learn to obviate our necessities, do not fail to unfit us for their accidental encounter.

Upon the whole, therefore, man is less able to support hunger than any other animal; and he is not better qualified to support a state of watchfulness. Indeed, sleep seems much more necessary to him, than

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to any other creature; as, when awake, he may be said to exhaust a greater proportion of the nervous fluid; and, consequently, to stand in need of an adequate supply. Other animals, when most awake, are but little removed from a state of slumber; their feeble faculties, imprisoned in matter, and rather exerted by impulse than deliberation, require sleep rather as a cessation from motion, than from thinking. But it is otherwise with man; his ideas, fatigued with their various excursions, demand a cessation, not less than the body, from toil; and he is the only creature that seems to require sleep from double motives; not less for the refreshment of the mental, than of the bodily frame.

There are some lower animals, indeed, that seem to spend the greatest part of their lives in sleep; but, properly speaking, the sleep of such may be considered as a kind of death; and their waking, a resurrection. Flies, and insects, are said to be asleep, at a time that all the vital motions have ceased; without respiration, without any circulation of their juices, if cut in pieces, they do not awake, nor does any fluid ooze out at the wound. These may be considered rather as congealed than as sleeping animals; and their rest, during winter, rather as a cessation from life, than a necessary refreshment:

freshment : but in the higher races of animals, whose blood is not thus congealed, and thawed by heat, these all bear the want of sleep much better than man ; and some of them continue a long time without seeming to take any refreshment from it whatsoever.

But man is more feeble ; he requires its due return ; and if it fails to pay the accustomed visit, his whole frame is in a short time thrown into disorder : his appetite ceases ; his spirits are dejected ; his pulse becomes quicker and harder ; and his mind, abridged of its slumbering visions, begins to adopt waking dreams. A thousand strange phantoms arise, which come and go without his will : these, which are transient in the beginning, at last take firm possession of the mind, which yields to their dominion, and, after a long struggle, runs into confirmed madness. In that horrid state, the mind may be considered as a city without walls, open to every insult, and paying homage to every invader ; every idea that then starts with any force, becomes a reality ; and the reason, over fatigued with its former importunities, makes no head against the tyrannical invasion, but submits to it from mere imbecility.

But it is happy for mankind, that this state of inquietude is seldom driven to an extreme ;

extreme ; and that there are medicines, which seldom fail to give relief. However, man finds it more difficult than any other animal to procure sleep : and some are obliged to court its approaches for several hours together, before they incline to rest. It is in vain that all light is excluded ; that all sounds are removed ; that warmth and softness conspire to invite it ; the restless and busy mind still retains its former activity ; and reason, that wishes to lay down the reins, in spite of herself, is obliged to maintain them. In this disagreeable state, the mind passes from thought to thought, willing to lose the distinctness of perception, by encreasing the multitude of the images. At last, when the approaches of sleep are near, every object of the imagination begins to mix with that next it ; their outlines become, in a manner, rounder ; a part of their distinctions fade away ; and sleep, that ensues, fashions out a dream from the remainder.

If then it should be asked from what cause this state of repose proceeds, or in what manner sleep thus binds us for several hours together, I must faintly confess my ignorance, although it is easy to tell what philosophers say upon the subject. Sleep, says one of them *, consists in a scarcity

* Rohault.

city of spirits, by which the orifices or pores of the nerves in the brain, through which the spirits used to flow into the nerves, being no longer kept open by the frequency of the spirits, shut of themselves; thus the nerves, wanting a new supply of spirits, become lax, and unfit to convey any impression to the brain. All this, however, is explaining a very great obscurity by somewhat more obscure: leaving, therefore, those spirits to open and shut the entrances to the brain, let us be contented with simply enumerating the effects of sleep upon the human constitution.

In sleep, the whole nervous frame is relaxed, while the heart and the lungs seem more forcibly exerted. This fuller circulation produces also a swelling of the muscles, as they always find who sleep with ligatures on any part of their body. This increased circulation also, may be considered as a kind of exercise, which is continued through the frame; and, by this, the perspiration becomes more copious, although the appetite for food is entirely taken away. Too much sleep dulls the apprehension, weakens the memory, and unfits the body for labour. On the contrary, sleep too much abridged, emaciates the frame, produces melancholy, and consumes the constitution. It requires some care, therefore, to regulate
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the quantity of sleep, and just to take as much as will completely restore Nature, without oppressing it. The poor, as Otway says, sleep little; forced, by their situation, to lengthen out their labour to their necessities, they have but a short interval for this pleasing refreshment; and I have ever been of opinion, that bodily labour demands a less quantity of sleep than mental. Labourers and artizans are generally satisfied with about seven hours; but I have known some scholars who usually slept nine, and perceived their faculties no way impaired by over-sleeping.

The famous Philip Barrettiere, who was considered as a prodigy of learning at the age of fourteen, was known to sleep regularly twelve hours in the twenty-four; the extreme activity of his mind, when awake, in some measure called for an adequate alternation of repose: and, I am apt to think, that when students stint themselves in this particular, they lessen the waking-powers of the imagination, and unfit it for its most strenuous exertions. Animals, that seldom think, as was said, can very easily dispense with sleep; and of men, such as think least, will very probably be satisfied with the smallest share. A life of study, it is well known, unfits the body for receiving this gentle refreshment; the approaches of
sleep

sleep are driven off by thinking : when, therefore, it comes at last, we should not be too ready to interrupt its continuance.

Sleep is, indeed, to some, a very agreeable period of their existence : and it has been a question in the schools, which was most happy, the man who was a beggar by night, and a king by day ; or he who was a beggar by day, and a king by night ? It is given in favour of the nightly monarch, by him who first started the question : for the dream, says he, gives the full enjoyment of the dignity, without its attendant inconveniencies ; while, on the other hand, the king, who supposes himself degraded, feels all the misery of his fallen fortune, without trying to find the comforts of his humble situation. Thus, by day, both states have their peculiar distresses : but, by night, the exalted beggar is perfectly blessed, and the king completely miserable. All this, however, is rather fanciful than just ; the pleasure dreams can give us, seldom reaches to our waking pitch of happiness : the mind often, in the midst of its highest visionary satisfactions, demands of itself, whether it does not owe them to a dream ; and frequently awakes with the reply.

But it is seldom, except in cases of the highest delight, or the most extreme uneasiness, that
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the mind has power thus to disengage itself from the dominion of fancy. In the ordinary course of its operations, it submits to those numberless phantastic images that succeed each other, and which, like many of our waking thoughts, are generally forgotten. Of these, however, if any, by their oddity, or their continuance, affect us strongly, they are then remembered; and there have been some who felt their impressions so strongly, as to mistake them for realities, and to rank them among the past actions of their lives.

There are others, upon whom dreams seem to have a very different effect; and who, without seeming to remember their impressions the next morning, have yet shewn, by their actions during sleep, that they were very powerfully impelled by their dominion. We have numberless instances of such persons, who, while asleep, have performed many of the ordinary duties to which they had been accustomed when waking; and, with a ridiculous industry, have completed by night, what they failed doing by day. We are told, in the German ephemerides, of a young student, who being enjoined a severe exercise by his tutor, went to bed, despairing of accomplishing it. The next morning, awaking, to his great surprize he found the task fairly written out,
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and finished in his own hand-writing. He was at first, as the account has it, induced to ascribe this strange production to the operations of an infernal agent; but his tutor, willing to examine the affair to the bottom, set him another exercise, still more severe than the former; and took precautions to observe his conduct the whole night. The young gentleman, upon being so severely tasked, felt the same inquietude that he had done on the former occasion; went to bed gloomy and pensive, pondering on the next day's duty, and, after some time, fell asleep. But shortly after, his tutor, who continued to observe him from a place that was concealed, was surprized to see him get up, and very deliberately go to the table; there he took out pen, ink, and paper, drew himself a chair, and sat very methodically to thinking: it seems, that his being asleep, only served to strengthen the powers of his imagination; for he very quickly and easily went through the task assigned him, put his chair aside, and then returned to bed to take out the rest of his nap. What credit we are to give to this account, I will not pretend to determine: but this may be said, that the book from whence it is taken, has some good marks of veracity; for it is very learned and very dull,
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and is written in a country well noted, if not for truth, at least for want of invention.

The ridiculous history of Arlotto is well known, who has had a volume written, containing a narrative of the actions of his life, not one of which was performed while he was awake. He was an Italian Franciscan friar, extremely rigid in his manners, and remarkably devout and learned in his daily conversation. By night, however, and during his sleep, he played a very different character from what he did by day, and was often detected in very atrocious crimes. He was at one time detected in actually committing a rape, and did not awake till the next morning, when he was surprized to find himself in the hands of justice. His brothers of the convent often watched him while he went very deliberately into the chapel, and there attempted to commit sacrilege. They sometimes permitted him to carry the chalice and the vestments away into his own chamber, and the next morning amused themselves at the poor man's consternation for what he had done. But of all his sleeping transgressions, that was the most ridiculous, in which he was called to pray for the soul of a person departed. Arlotto, after having very devoutly performed his duty, retired to a chamber which was shewn him, to rest ;
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but there he had no sooner fallen asleep, than he began to reflect that the dead body had got a ring upon one of the fingers, which might be useful to him : accordingly, with a pious resolution of stealing it, he went down, undressed as he was, into a room full of women, and, with great composure, endeavoured to seize the ring. The consequence was, that he was taken before the inquisition for witchcraft ; and the poor creature had like to have been condemned, till his peculiar character accidentally came to be known : however, he was ordered to remain for the rest of life in his own convent, and upon no account whatsoever to stir abroad.

What are we to say to such actions as these ; or how account for this operation of the mind in dreaming ? It should seem, that the imagination, by day, as well as by night, is always employed ; and that often, against our wills, it intrudes where it is least commanded or desired. While awake, and in health, this busy principle cannot much delude us : it may build castles in the air, and raise a thousand phantoms before us ; but we have every one of the senses alive, to bear testimony to its falsehood. Our eyes shew us that the prospect is not present : our hearing, and our touch, depose against
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its reality ; and our taste and smelling are equally vigilant in detecting the impostor. Reason, therefore, at once gives judgment upon the cause ; and the vagrant intruder, imagination, is imprisoned, or banished from the mind. But in sleep it is otherwise ; having, as much as possible, put our senses from their duty, having closed the eyes from seeing, and the ears, taste, and smelling, from their peculiar functions, and having diminished even the touch itself, by all the arts of softness, the imagination is then left to riot at large, and to lead the understanding without an opposer. Every incur-sive idea then becomes a reality ; and the mind, not having one power that can prove the illusion, takes them for truths. As in madness, the senses, from struggling with the imagination, are at length forced to submit, so, in sleep, they seem for a while soothed into the like submission ; the smallest violence exerted upon any one of them, however, rouses all the rest in their mutual defence ; and the imagination, that had for a while told its thousand falsehoods, is totally driven away, or only permitted to pass under the custody of such as are every moment ready to detect its imposition.

C H A P. VII.

Of seeing*.

“H A V I N G mentioned the senses as correcting the errors of the imagination, and as forcing it, in some measure, to bring us just information, it will naturally follow that we should examine the nature of those senses themselves : we shall thus be enabled to see how far they also impose on us, and how far they contribute to correct each other. Let it be observed, however, that in this we are neither giving a treatise of optics, or phonics, but an history of our own perceptions; and to those we chiefly confine ourselves.”

The eyes very soon begin to be formed in the human embryo, and in the chicken also. Of all the parts which the animal has double, the eyes are produced the soonest, and appear the most prominent. It is true, indeed, that in viviparous animals, and particularly in man, they are not so large in

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proportion,

* This chapter is taken from Mr. Buffon. I believe the reader will readily excuse any apology ; and, perhaps, may wish that I had taken this liberty much more frequently. What I add is marked, as in a former instance, with inverted commas, “ thus.”

proportion, at first, as in the oviparous kinds ; nevertheless, they are more speedily developed, when they begin to appear, than any other parts of the body. It is the same with the organ of hearing ; the little bones that go to compose the internal parts of the ear, are entirely formed before the other bones, though much larger, have acquired any part of their growth, or solidity. Hence it appears, that those parts of the body which are furnished with the greatest quantity of nerves, are the first in forming. Thus the brain, and the spinal marrow, are the first seen begun in the embryo ; and, in general, it may be said, that wherever the nerves go, or send their branches in great numbers, there the parts are soonest begun, and the most completely finished.

If we examine the eyes of a child some hours, or even some days after its birth, it will be easily discerned that it, as yet, makes no use of them. The humours of the organ not having as yet acquired a sufficient consistence, the rays of light strike but confusedly upon the retina, or expansion of nerves at the back of the eye. It is not till about a month after they are born, that children fix them upon objects ; for, before that time, they turn them indiscriminately every where, without appearing to be affected

fectcd by any. At six, or seven weeks old, they plainly discover a choice in the objects of their attention ; they fix their eyes upon the most brilliant colours, and seem peculiarly desirous of turning them towards the light. Hitherto, however, they only seem to fortify the organ for seeing distinctly ; but they have still many illusions to correct.

The first great error in vision is, that the eye inverts every object ; and it in reality appears to the child, until the touch has served to undeceive it, turned upside down. A second error in division is, that every object appears double. The same object forms itself distinctly upon each eye ; and is consequently seen twice. This error, also, can only be corrected by the touch ; and although, in reality, every object we see appears inverted, and double, yet the judgment, and habit, have so often corrected the sense, that we no longer submit to its imposition, but see every object in its just position, the very instant it appears. Were we, therefore, deprived of feeling, our eyes would not only misrepresent the situation, but also the number of all things round us.

To convince us that we see objects inverted, we have only to observe the manner in which images are represented, coming through a small hole, in a darkened room. If

such a small hole be made in a dark room, so that no light can come in, but through that, all the objects without will be painted on the wall behind, but in an inverted position, their heads downwards. For as all the rays which pass from the different parts of the object without, cannot enter the hole in the same extent which they had in leaving the object, since, if so, they would require the aperture to be as large as the object; and, as each part, and every point of the object, sends forth the image of itself on every side, and the rays, which form these images, pass from all points of the object as from so many centres, so such only can pass through the small aperture as come in opposite directions. Thus the little aperture becomes a centre for the entire object; through which the rays from the upper parts, as well as from the lower parts of it, pass in converging directions; and, consequently, they must cross each other in the central point, and thus paint the objects behind, upon the wall, in an inverted position.

It is, in like manner, easy to conceive, that we see all objects double, whatever our present sensations may seem to tell us to the contrary. For, to convince us of this, we have only to compare the situation of any one object on shutting one eye, and then

then compare the same situation by shutting the other. If, for instance, we hold up a finger, and shut the right eye, we shall find it hide a certain part of the room; if again reshutting the other eye, we shall find that part of the room visible, and the finger seeming to cover a part of the room that had been visible before. If we open both eyes, however, the part covered will appear to lie between the two extremes. But, the truth is, we see the object, our finger had covered, one image of it to the right, and the other to the left; but, from habit, suppose that we see but one image placed between both; our sense of feeling having corrected the errors of sight. And thus, also, if instead of two eyes we had two hundred, we should, at first, fancy the objects encreased in proportion, until one sense had corrected the errors of another.

“The having two eyes might thus be said to be rather an inconvenience than a benefit, since one eye would answer the purposes of sight as well, and be less liable to illusion. But it is otherwise; two eyes greatly contribute, if not too distinct, at least to extensive vision*. When an object is placed at a moderate distance, by the means of both eyes we see a larger share of it than

* Leonardo da Vinci.

than we possibly could with one; the right eye seeing a greater portion of its right side, and the left eye of its correspondent side. Thus both eyes, in some measure, see round the object; and it is this that gives it, in nature, that bold relieve, or swelling, with which they appear; and which no painting, how exquisite soever, can attain to. The painter must be contented with shading on a flat surface; but the eyes, in observing nature, do not behold the shading only, but a part of the figure also, that lies behind those very shadings, which gives it that swelling, which painters so ardently desire, but can never fully imitate."

"There is another defect, which either of the eyes, taken singly, would have, but which is corrected, by having the organ double. In either eye there is a point, which has no vision whatsoever; so that if one of them only is employed in seeing, there is a part of the object to which it is always totally blind. This is that part of the optic nerve where its vein and artery run; which being insensible, that point of the object that is painted there must continue unseen. To be convinced of this we have only to try a very easy experiment. If we take three black patches, and stick them upon a white wall, about a foot distant from each other, each about as high

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as the eye that is to observe them; then retiring six or seven feet back, and shutting one eye, by trying for some time, we shall find, that while we distinctly behold the black spots that are to the right and left, that which is in the middle remains totally unseen. Or, in other words, when we bring that part of the eye, where the optic artery runs, to fall upon the object, it will then become invisible. This defect, however, in either eye, is always corrected by both, since the part of the object that is unseen by one, will be very distinctly perceived by the other."

Beside the former defects we can have no idea of distances from the sight, without the help of touch. Naturally every object we see appears to be within our eyes; and a child, who has as yet made but little use of the sense of feeling, must suppose that every thing it sees makes a part of itself. Such objects are only seen more or less bulky as they approach, or recede from its eyes; so that a fly that is near will appear larger than an ox at a distance. It is experience alone that can rectify this mistake; and a long acquaintance with the real size of every object, quickly assures us of the distance at which it is seen. The last man in a file of soldiers appears in reality much less, perhaps ten times more diminutive, than

than the man next to us; however, we do not perceive this difference, but continue to think him of equal stature; for the numbers we have seen thus lessened by distance, and have found, by repeated experience, to be of the natural size, when we come closer, instantly corrects the sense, and every object is perceived with nearly its natural proportion. But it is otherwise, if we observe objects in such situations as we have not had sufficient experience to correct the errors of the eye; if, for instance, we look at men from the top of an high steeple, they, in that case, appear very much diminished, as we have not had an habit of correcting the sense in that position.

Although a small degree of reflection will serve to convince us of the truth of these positions, it may not be amiss to strengthen them by an authority which cannot be disputed. Mr. Cheselden having cured a boy of thirteen for a cataract, who had hitherto been blind, and thus at once having restored him to sight, curiously marked the progress of his mind, upon that occasion. This youth, though he had been till then incapable of seeing, yet was not totally blind, but could tell day from night, as persons in his situation always may. He could also, with a strong light, distinguish black from

from white, and either from the vivid colour of scarlet; however, he saw nothing of the form of bodies; and, without a bright light, not even colours themselves. He was, at first, couched only in one of his eyes; and, when he saw for the first time, he was so far from judging of distances, that he supposed that his eyes touched every object that he saw, in the same manner as his hands might be said to feel them. The objects that were most agreeable to him were such as were of plain surfaces and regular figures; tho' he could as yet make no judgment whatever of their different forms, nor give a reason why one pleased him more than another. Although he could form some idea of colours during his state of blindness, yet that was not sufficient to direct him at present; and he could scarcely be persuaded that the colours he now saw were the same with those he had formerly conceived such erroneous ideas of. He delighted most in green; but black objects, as if giving him an idea of his former blindness, he regarded with horror. He had, as was said, no idea of forms; and was unable to distinguish one object from another, though never so different. When those things were shown him, which he had been formerly familiarized to, by his feeling, he beheld them with earnestness, in order to remember

member them a second time ; but, as he had too many to recollect at once, he forgot the greatest number ; and for one he could tell, after seeing, there was a thousand he was totally unacquainted with. He was very much surprized to find that those things and persons he loved best were not the most beautiful to be seen ; and even testified displeasure in not finding his parents so handsome as he conceived them to be. It was near two months before he could find that a picture resembled a solid body. Till then he only considered it as a flat surface, variously shadowed ; but, when he began to perceive that these kind of shadings actually represented human beings, he then began to examine, by his touch, whether they had not the usual qualities of such bodies, and was greatly surprized to find, what he expected a very unequal surface, to be smooth and even. He was then shewn a miniature picture of his father, which was contained in his mother's watch-case, and he readily perceived the resemblance ; but asked, with great astonishment, how so large a face could be contained in so small a compass. It seemed as strange to him as if a bushel was contained in a pint vessel. At first, he could bear but a very small quantity of light, and he saw every object much greater than the life ;
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but, in proportion as he saw objects that were really large, he seemed to think the former were diminished; and although he knew the chamber where he was contained in the house, yet, until he saw the latter, he could not be brought to conceive how an house could be larger than a chamber. Before the operation he had no great expectations from the pleasure he should receive from a new sense; he was only excited by the hopes of being able to read and write; he said, for instance, that he could have no greater pleasure in walking, in the garden, with his sight than he had without it, for he walked there at his ease, and was acquainted with all the walks. He remarked also, with great justice, that his former blindness gave him one advantage over the rest of mankind, which was that of being able to walk in the night, with confidence and security. But, when he began to make use of his new sense, he seemed transported beyond measure. He said that every new object was a new source of delight, and that his pleasure was so great as to be past expression. About a year after, he was brought to Epsom, where there is a very fine prospect, with which he seemed greatly charmed; and he called the landscape before him a new method of seeing. He was couched in

in the other eye, a year after the former, and the operation succeeded equally well : when he saw with both eyes, he said that objects appeared to him twice as large as when he saw but with one ; however, he did not see them doubled, or at least he shewed no marks as if he saw them so. Mr. Cheselden mentions instances of many more that were restored to sight in this manner ; they all seemed to concur in their perceptions with this youth ; and they all seemed particularly embarrassed in learning how to direct their eyes to the objects they wished to observe.

In this manner it is that our feeling corrects the sense of seeing, and that objects which appear of very different sizes, at different distances, are all reduced, by experience, to their natural standard. “ But not the feeling only, but also the colour, and brightness of the object, contributes, in some measure, to assist us in forming an idea of the distance at which it appears *. Those which we see most strongly marked with light and shade, we readily know to be nearer than those on which the colours are more faintly spread, and that, in some measure, take a part of their hue from the air
between

* Mr Buffon gives a different theory, for which I must refer the reader to the original. That I have given, I take to be easy, and satisfactory enough.

between us and them. Bright objects also, are seen at a greater distance than such as are obscure, and, most probably, for this reason, that, being less similar in colour to the air which interposes, their impressions are less effaced by it, and they continue more distinctly visible. Thus a black and distant object is not seen so far off as a bright and glittering one; and a fire by night is seen much farther off than by day."

The power of seeing objects at a distance is very rarely equal in both eyes. When this inequality is in any great degree, the person so circumstanced then makes use only of one eye, shutting that which sees the least, and employing the other with all its power. And hence proceeds that aukward look which is known by the name of strabism.

There are many reasons to induce us to think that such as are near-sighted see objects larger than other persons; and yet the contrary is most certainly true, for they see them less. Mr. Buffon informs us that he himself is short-sighted, and that his left eye is stronger than his right. He has very frequently experienced, upon looking at any object, such as the letters of a book, that they appear less to the weakest eye; and that when he places the book, so as that

that the letters appear double, the images of the left eye, which is strongest, are greater than those of the right, which is the most feeble. He has examined several others, who were in similar circumstances, and has always found that the best eye saw every object the largest. This he ascribes to habit; for near-sighted people being accustomed to come close to the object, and view but a small part of it at a time, the habit ensues, when the whole of an object is seen, and it appears less to them than to others.

Infants having their eyes less than those of adults, must see objects also smaller in proportion. For the image formed on the back of the eye will be large, as the eye is capacious; and infants, having it not so great, cannot have so large a picture of the object. This may be a reason also why they are unable to see so distinctly, or at such distances as persons arrived at maturity.

Old men, on the contrary, see bodies close to them very indistinctly, but bodies at a great distance from them with more precision; and this may happen from an alteration in the coats, or, perhaps, humours of the eye; and not, as is supposed, from their diminution. The cornea, for instance, may become too rigid to adapt itself, and take a proper convexity for seeing minute objects; and

and its very flatness will be sufficient to fit it for distant vision.

When we cast our eyes upon an object extremely brilliant, or when we fix and detain them too long upon the same object, the organ is hurt and fatigued, its vision becomes indistinct, and the image of the body, which has thus too violently, or too perseveringly employed us, is painted upon every thing we look at, and mixes with every object that occurs. "And this is an obvious consequence of the eye taking in too much light, either immediately, or by reflexion. Every body whatsoever that is exposed to the light, for a time, drinks in a quantity of its rays, which, being brought into darkness, it cannot instantly discharge. Thus the hand, if it be exposed to broad day light, for some time, and then immediately snatched into a dark room, will appear still luminous; and it will be some time before it is totally darkened. It is thus with the eye; which, either by an instant gaze at the sun, or a steady continuance, upon some less brilliant object, has taken in too much light; its humours are, for a while, unfit for vision, until that be discharged, and room made for rays of a milder nature." How dangerous the looking upon bright and luminous objects is to the sight, may be easily seen, from such

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as live in countries, covered for most part of the year with snow, who become generally blind before their time. Travellers themselves, who cross these countries, are obliged to wear a crape before their eyes, to save their eyes, which would otherwise be rendered totally unserviceable; and it is equally dangerous in the sandy plains of Africa. The reflexion of the light is there so strong, that it is impossible to sustain the effect, without incurring the danger of losing one's sight entirely. Such persons, therefore, as read, or write for any continuance, should chuse a moderate light, in order to save their eyes; and, although it may seem insufficient at first, the eye will accustom itself to the shade, by degrees, and be less hurt by the want of light than the excess.

“ It is, indeed, surprizing how far the eye can accommodate itself to darkness, and make the best of a gloomy situation. When first taken from the light, and brought into a dark room, all things disappear; or, if any thing is seen, it is only the remaining radiations that still continue in the eye. But, after a very little time, when these are spent, the eye takes the advantage of the smallest ray that happens to enter; and this alone would, in time, serve for many of the purposes of life. There was a gentleman

gentleman of great courage and understanding, as we are told, by Boyle, who was a major under King Charles the First. This unfortunate man sharing in his master's misfortunes, and being forced abroad, undertook at Madrid to do his king a signal service; but, unluckily, failed in the attempt. In consequence of this, he was instantly ordered to a dark and dismal dungeon, into which the light never entered, and into which there was no opening but by an hole at the top; down which the keeper put his provisions, and presently closed it again on the other side. In this manner the unfortunate loyalist continued for some weeks, distressed and disconsolate; but, at last, began to think he saw some little glimmering of light. This internal dawn seemed to encrease from time to time, so that he could not only discover the parts of his bed, and such other large objects, but, at length, he even began to perceive the mice that frequented his cell; and saw them as they ran about the floor, eating the crumbs of bread that happened to fall. After some months confinement he was at last set free; but, such was the effect of the darkness upon him, that he could not for some days venture to leave his dungeon, but was obliged to accustom himself by degrees to the light of the day.

C H A P. VIII.

Of Hearing *.

AS the sense of hearing, as well as of sight, gives us notice of remote objects, so, like that, it is subject to similar errors, being capable of imposing on us upon all occasions, where we cannot rectify it by the sense of feeling. We can have from it no distinct intelligence of the distance from whence a sounding body is heard; a great noise far off, and a small one very near, produce the same sensation; and, unless we receive information from some other sense, we can never distinctly tell whether the sound be a great or a small one. It is not till we have learned, by experience, that the particular sound which is heard, is of a peculiar kind; then we can judge of the distance from whence we hear it. When we know the tone of the bell, we can then judge how far it is from us.

Every body that strikes against another produces a sound, which is simple, and but one in bodies which are not elastic, but which is often repeated in such as are. If
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* This chapter is taken from Mr. Buffon, except where marked by inverted commas.

we strike a bell, or a stretched string, for instance, which are both elastic, a single blow produces a sound, which is repeated by the undulations of the sonorous body, and which is multiplied as often as it happens to undulate, or vibrate. These undulations each strike their own peculiar blow; but they succeed so fast, one behind the other, that the ear supposes them one continued sound; whereas, in reality, they make many. A person who should, for the first time, hear the toll of the bell, would, very probably, be able to distinguish these breaks of sound; and, in fact, we can readily ourselves perceive an intension and remission in the sound.

In this manner, sounding bodies are of two kinds; those unelastic ones, which being struck, return but a single sound; and those more elastic returning a succession of sounds; which uniting together form a tone. This tone may be considered as a great number of sounds, all produced one after the other, by the same body, as we find in a bell, or the string of an harpsichord, which continues to sound for some time after it is struck. A continuing tone may be also produced from a non-elastic body, by repeating the blow quick and often, as when we beat a drum, or when we draw a bow along the string of a fiddle.

Considering the subject in this light, if we should multiply the number of blows, or repeat them at quicker intervals upon the sounding body, as upon the drum, for instance, it is evident that this will have no effect in altering the tone; it will only make it either more even or more distinct. But it is otherwise, if we encrease the force of the blow; if we strike the body with double weight, this will produce a tone twice as loud as the former. If, for instance, I strike a table with a switch, this will be very different from the sound produced by striking it with a cudgel. From hence, therefore, we may infer, that all bodies give a louder and graver tone, not in proportion to the number of times they are struck, but in proportion to the force that strikes them. And, if this be so, those philosophers who make the tone of a sonorous body, of a bell, or the string of an harpsichord, for instance, to depend upon the number only of its vibrations, and not the force, have mistaken what is only an effect for a cause. A bell, or an elastic string, can only be considered as a drum beaten; and the frequency of the blows can make no alteration whatsoever in the tone. The largest bells, and the longest and thickest strings, have the most forceful vibrations; and, therefore, their tones are the most loud and the most grave.

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To know the manner in which sounds thus produced become pleasing, it must be observed, no one continuing tone, how loud or swelling soever, can give us satisfaction; we must have a succession of them, and those in the most pleasing proportion. The nature of this proportion may be thus conceived. If we strike a body incapable of vibration with a double force, or, what amounts to the same thing, with a double mass of matter, it will produce a sound that will be doubly grave. Music has been said, by the ancients, to have been first invented from the blows of different hammers on an anvil. Suppose then we strike an anvil with an hammer of one pound weight, and again with an hammer of two pounds, it is plain that the two pound hammer will produce a sound twice as grave as the former. But if we strike with a two pound hammer, and then with a three pound, it is evident that the latter will produce a sound one-third more grave than the former. If we strike the anvil with a three pound hammer, and then with a four pound, it will likewise follow that the latter will be a quarter part more grave than the former. Now, in the comparing between all those sounds, it is obvious that the difference between one and two is more easily perceived than between two and three, three and four, or any numbers

numbers succeeding in the same proportion. The succession of sounds will be, therefore, pleasing in proportion to the ease with which they may be distinguished. That sound which is double the former, or, in other words, the octave to the preceding tone, will of all others be the most pleasing harmony. The next to that, which is as two to three, or, in other words, the third, will be most agreeable. And thus universally, those sounds whose differences may be most easily compared are the most agreeable.

“ Musicians, therefore, have contented themselves with seven different proportions of sound, which are called notes, and which sufficiently answer all the purposes of pleasure. Not but that they might adopt a greater diversity of proportions; and some have actually done so; but, in these, the differences of the proportion are so imperceptible, that the ear is rather fatigued than pleased in making the distinction. In order, however, to give variety, they have admitted half tones; but, in all the countries where music is yet in its infancy they have rejected such; and they can find music in none but the obvious ones. The Chinese, for instance, have neither flats nor sharps in their music; but the intervals between their other notes, are in the same proportion with ours.

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“Many more barbarous nations have their peculiar instruments of music; and, what is remarkable, the proportion between their notes is in all the same as in ours. This is not the place for entering into the nature of these sounds, their effects upon the air, or their consonances with each other. We are not now giving an history of sound, but of human perception.

“All countries are pleased with music; and, if they have not skill enough to produce harmony, at least they seem willing to substitute noise. Without all question, noise alone is sufficient to operate powerfully on the spirits; and, if the mind be already pre-disposed to joy, I have seldom found noise fail of encreasing it into rapture. The mind feels a kind of distracted pleasure in such powerful sounds, braces up every nerve, and riots in the excess. But, as in the eye, an immediate gaze upon the sun will disturb the organ, so, in the ear, a loud, unexpected noise, disorders the whole frame, and sometimes disturbs the sense ever after. The mind must have time to prepare for the expected shock, and give to its organs the proper tension for its arrival.”

“Musical sounds, however, seem of a different kind. Those are generally most pleasing, which are most unexpected. It is not

not from bracing up the nerves, but from the grateful succession of the sounds, that these become so charming. There are few, how indifferent soever, but have at times felt their pleasing impression; and, perhaps, even those who have stood out against the powerful persuasion of sounds, only wanted the proper tune, or the proper instrument, to allure them."

"The ancients give us a thousand strange instances of the effects of music, upon men and animals. The story of Arion's harp, that gathered the dolphins to the ship side, is well known; and, what is remarkable, Schotteus assures us *, that he saw a similar instance of fishes being allured by music, himself. They tell us of diseases that have been cured, unchastity corrected, seditions quelled, passions removed, and sometimes excited even to madness. Doctor Wallis has endeavoured to account for these surprising effects, by ascribing them to the novelty of the art. For my own part, I can scarce hesitate to impute them to the exaggeration of their writers. They are as hyperbolical in the effects of their oratory; and yet, we well know, there is nothing in the orations which they have left us, capable
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* Quod oculis meis spectavi. Schotti Magic. universalis, pars ii. l. 1. p. 26.

of exciting madness, or of raising the mind to that ungovernable degree of fury which they describe. As they have exaggerated, therefore, in one instance, we may naturally suppose, that they have done the same in the other: and, indeed, from the few remains we have of their music, collected by Meibomius, one might be apt to suppose, there was nothing very powerful in what is lost. Nor does any one of the ancient instruments, such as we see them represented in statues, appear comparable to our fiddle."

"However this be, we have many odd accounts, not only among them, but the moderns, of the power of music; and it must not be denied, but that, on some particular occasions, musical sounds may have a very powerful effect. I have seen all the horses and cows in a field, where there were above an hundred, gather round a person that was blowing the French horn, and seeming to testify an aukward kind of satisfaction. Dogs are well known to be very sensible of different tones in music; and I have sometimes heard them sustain a very ridiculous part in a concert, where their assistance was neither expected nor desired."

"We are told *, of Henry IV. of Denmark, that being one day desirous of trying
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* Olavi Magni, l. 15. hist. c. 28.

in person whether a musician who boasted that he could excite men to madness, was not an impostor, he submitted to the operation of his skill: but the consequence was much more terrible than he expected; for, becoming actually mad, he killed four of his attendants, in the midst of his transports. A contrary effect of music we have *, in the cure of a madman, of Alais, in France, by music. This man, who was a dancing-master, after a fever of five days, grew furious, and so ungovernable, that his hands were obliged to be tied to his sides: what at first was rage, in a short time was converted into silent melancholy, which no arts could exhilarate, and no medicines remove. In this sullen and dejected state, an old acquaintance accidentally came to enquire after his health; he found him sitting up in bed, tied, and totally regardless of every external object round him. Happening, however, to take up a fiddle that lay in the room, and touching a favourite air, the poor madman instantly seemed to brighten up at the sound; from a recumbent posture, he began to sit up; and as the musician continued playing, the patient seemed desirous of dancing to the sound: but he was tied, and incapable of leaving his bed, so that

* Hist. de l'Accad. 1708, p. 22.

that he could only humour the tune with his head, and that part of his arms which were at liberty. Thus the other continued playing, and the dancing-master practised his own art, as far as he was able, for about a quarter of an hour, when suddenly falling into a deep sleep, in which his disorder came to a crisis, he awaked perfectly recovered."

"A thousand other instances might be added, equally true: let it suffice to add one more, which is not true; I mean that of the tarantula. Every person who has been in Italy, now well knows, that the bite of this animal, and its being cured by music, is all a deception. When strangers come into that part of the country, the country people are ready enough to take money for dancing to the tarantula. A friend of mine had a servant who suffered himself to be bit; the wound, which was little larger than the puncture of a pin, was uneasy for a few hours, and then became well without any farther assistance. Some of the country people, however, still make a tolerable livelihood of the credulity of strangers, as the musician finds his account in it not less than the dancer."

Sounds, like light, are not only extensively diffused, but are frequently reflected. The laws of this reflection, it is true, are not as well

well understood as those of light ; all we know is, that sound is principally reflected by hard bodies ; and their being hollow also, sometimes encreases the reverberation.

“ No art, however, can make an echo ; and some, who have bestowed great labour and expence upon such a project, have only erected shapeless buildings, whose silence was a mortifying lecture upon their presumption.”

The internal cavity of the ear seems to be fitted up for the purposes of echoing sound with the greatest precision. This part is fashioned out in the temporal bone, like a cavern cut into a rock. “ In this the sound is repeated and articulated ; and, as some anatomists tell us, (for we have as yet but very little knowledge on this subject) is beaten against the tympanum, or drum of the ear, which moves four little bones joined thereto ; and these move and agitate the internal air which lies on the other side ; and, lastly, this air strikes and affects the auditory nerves, which carry the sound to the brain.”

One of the most common disorders in old age is deafness ; which probably proceeds from the rigidity of the nerves in the labyrinth of the ear. This disorder also, sometimes proceeds from a stoppage of the wax, which art may easily remedy. In order

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to know whether the defect be an internal or an external one, let the deaf person put a repeating watch into his mouth ; and if he hears it strike, he may be assured that his disorder proceeds from an external cause, and is in some measure, curable : “ for there is a passage from the ears into the mouth, by what anatomists call the Eustachian tube ; and, by this passage, people often hear sounds, when they are utterly without hearing through the larger channel : and this also is the reason that we often see persons who listen with great attention, hearken with their mouths open, in order to catch all the sound at every aperture.”

It often happens, that persons hear differently with one ear from the other ; and it is generally found that these have what is called, by musicians, a bad ear. Mr. Buffon, who has made many trials upon persons, of this kind, always found that their defect in judging properly of sounds, proceeded from the inequality of their ears ; and receiving by both, at the same time, unequal sensations, they form an unjust idea. In this manner, as those people hear false, they also, without knowing it, sing false. Those persons also frequently deceive themselves with regard to the side from whence the sound comes, generally supposing the noise to come on the part of the best ear.

Such

Such as are hard of hearing, find the same advantage in the trumpet made for this purpose, that short-sighted persons do from glasses. These trumpets might be easily enlarged, so as to encrease sounds, in the same manner that the telescope does bodies: however, they could be used to advantage only in a place of solitude and stillness, as the neighbouring sounds would mix with the more distant, and the whole would produce in the ear nothing but tumult and confusion.

Hearing is a much more necessary sense to man than to animals. With these it is only a warning against danger, or an encouragement to mutual assistance. In man, it is the source of most of his pleasures; and without which, the rest of his senses would be of little benefit. A man born deaf, must necessarily be dumb; and his whole sphere of knowledge must be bounded only by sensible objects. We have an instance of a young man who, being born deaf, was restored, at the age of twenty-four, to perfect hearing: the account is given in the Memoirs of the Academy of Sciences, 1703, page 18.

A young man, of the town of Chartres, between the age of twenty-three and twenty-four, the son of a tradesman, and deaf
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and dumb from his birth, began to speak all of a sudden, to the great astonishment of the whole town. He gave them to understand that, about three or four months before, he had heard the sound of the bells for the first time, and was greatly surprized at this new and unknown sensation. After some time, a kind of water issued from his left ear, and he then heard perfectly well with both. During these three months, he was sedulously employed in listening without saying a word, and accustoming himself to speak softly, so as not to be heard, the words pronounced by others. He laboured hard also in perfecting himself in the pronounciation, and in the ideas attached to every sound. At length, having supposed himself qualified to break silence, he declared, that he could now speak, although as yet but imperfectly. Soon after, some able divines questioned him concerning his ideas of his past state; and principally with respect to God, his soul, the morality or turpitude of actions. The young man, however, had not driven his solitary speculations into that channel. He had gone to mass indeed with his parents, had learned to sign himself with the cross, to kneel down and assume all the grimaces of a man that was praying; but he did
all

all this without any manner of knowledge of the intention or the cause ; he saw others do the like, and that was enough for him ; he knew nothing even of death, and it never entered into his head ; he led a life of pure animal instinct ; entirely taken up with sensible objects, and such as were present, he did not seem even to make as many reflections upon these, as might reasonably be expected from his improving situation : and yet, the young man was not in want of understanding ; but the understanding of a man, deprived of all commerce with others, is so very confined, that the mind is in some measure totally under the control of its immediate sensations.

Notwithstanding, it is very possible to communicate ideas to deaf men, which they previously wanted, and even give them very precise notions of some abstract subjects, by means of signs, and of letters. A person born deaf, may, by time, and sufficient pains, be taught to write and read, to speak, and, by the motions of the lips, to understand what is said to him : however, it is probable that, as most of the motions of speech are made within the mouth by the tongue, the knowledge from the motion of the lips, is but very confined : “nevertheless,
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I have conversed with a gentleman thus taught, and in all the commonly occurring questions, and the usual salutations, he was ready enough, merely by attending to the motion of the lips alone. When I ventured to speak for a short continuance, he was totally at a loss, although he understood the subject, when written, extremely well." Persons taught in this manner, were at first considered as prodigies; but there have been so many instances of success of late, and so many are skilful in the art of instructing in this way, that, though still a matter of some curiosity, it ceases to be an object of wonder.



C H A P. IX.

Of smelling, feeling, and tasting.

AN animal may be said to fill up that sphere which he can reach by his senses; and is actually large in proportion to the sphere to which its organ extends. By sight, man's enjoyments are diffused into a wide circle; that of hearing, tho' less widely diffused, nevertheless extends his powers; the sense of smelling is more contracted still; and the taste and touch are the most confined of all. Thus man enjoys very distant objects, but with one sense only; more nearly he brings two senses at once to bear upon them; his sense of smelling assists the other two, at its own distance; and of such objects, as a man, he may be said to be in perfect possession.

Each sense, however, the more it acts at a distance, the more capable it is of making combinations; and is, consequently, the more improveable. Refined imaginations, and men of strong minds, take more pleasure, therefore, in improving the delights of the distant senses, than in enjoying such as are scarce capable of improvement.

By combining the objects of the extensive senses, all the arts of poetry, painting, and
harmony,

harmony, have been discovered; but the cloſer ſenſes, if I may ſo call them, ſuch as ſmelling, taſting, and touching, are, in ſome meaſure, as ſimple as they are limited, and admit of little variety. The man of imagination makes a great and an artificial happineſs, by the pleaſure of altering and combining; the ſenſualiſt juſt ſtops where he began, and cultivates only thoſe pleaſures which he cannot improve. The ſenſualiſt is contented with thoſe enjoyments that are already made to his hand; but the man of pleaſure is beſt pleaſed with growing happineſs.

Of all the ſenſes, perhaps, there is not one in which man is more inferior to other animals than in that of ſmelling. With man, it is a ſenſe that acts in a narrow ſphere, and diſguſts almoſt as frequently as it gives him pleaſure. With many other animals it is diffuſed to a very great extent; and never ſeems to offend them. Dogs not only trace the ſteps of other animals, but alſo diſcover them by the ſcent, at a very great diſtance; and, while they are thus exquisitely ſenſible of all ſmells, they ſeem no way diſguſted by any.

But, although this ſenſe is, in general, ſo very inferior in man, it is much ſtronger in thoſe nations that abſtain from animal

food, than among us of Europe. The Bramins of India have a power of smelling, as I am informed, equal to what it is in most other creatures. They can smell the water which they drink, that to us seems quite inodorous; and have a word, in their language, which denotes a country of fine water. We are told, also, that the Negroes of the Antilles, by the smell alone, can distinguish between the footsteps of a Frenchman and a Negro. It is possible, therefore, that we may dull this organ by our luxurious way of living; and sacrifice to the pleasures of taste those which might be received from perfume.

However, it is a sense that we can, in some measure, dispense with; and I have known many that wanted it entirely, with but very little inconvenience from its loss. In a state of nature it is said to be useful to us, in guiding us to proper nourishment, and deterring us from that which is unwholesome; but, in our present situation, such information is but little wanted; and, indeed, but little attended to. In fact, the sense of smelling gives us very often false intelligence. Many things that have a disagreeable odour are, nevertheless, wholesome, and pleasant to the taste; and such as make eating an art, seldom think a meal fit to please the appetite till it begins to offend

offend the nose. On the other hand, there are many things that smell most gratefully, and yet are noxious, or fatal to the constitution. Some physicians think that all perfumes, in general, are unwholesome; that they relax the nerves, produce head aches, and even retard digestion. The machinel apple, which is known to be deadly poison, is possessed of the most grateful odour. Some of those mineral vapours that are often found fatal, in the stomach, smell like the sweetest flowers, and continue thus to flatter till they destroy. This sense, therefore, as it should seem, was never meant to direct us in the choice of food, but appears rather as an attendant than a necessary pleasure.

Indeed, if we examine the natives of different countries, or even different natives of the same, we shall find no pleasure in which they differ so widely as that of smelling. Some persons are pleased with the smell of a rose; while I have known others that could not abide to have it approach them. The savage nations are highly delighted with the smell of assafœtida, which is to us the most nauseous stink in nature. It would in a manner seem that our delight in perfumes was made by habit; and that a very little industry could bring us

us totally to invert the perception of odours.

Thus much is certain, that many bodies which at one distance are an agreeable perfume, when nearer are a most ungrateful odour. Musk, and ambergrease, in small quantities, are considered by most persons as highly fragrant; and yet, when in larger masses, their scent is insufferable. From a mixture of two bodies, each whereof is, of itself, void of all smell, a very powerful smell may be drawn. Thus, by grinding quick lime with sal-ammoniac, may be produced a very foetid mixture. On the contrary, from a mixture of two bodies, that are separately disagreeable, a very pleasant aromatic odour may be gained. A mixture of aqua fortis with spirit of wine produces this effect. But not only the alterations of bodies, by each other, but the smallest change in us, makes a very great alteration in this sense, and frequently deprives us of it totally. A slight cold often hinders us from smelling; and as often changes the nature of odours. Some persons, from disorder, retain an incurable aversion to those smells which most pleased them before; and many have been known to have an antipathy to some animals, whose presence they instantly perceive by the smell. From all this, therefore, the sense of
smelling

smelling appears to be an uncertain monitor, easily disordered, and not much missed when totally wanting.

The sense most nearly allied to smelling is that of tasting. This, some have been willing to consider merely as a nicer kind of touch, and have undertaken to account, in a very mechanical manner, for the difference of flavours. Such bodies, say they, as are pointed, happening to be applied to the papillæ of the tongue, excite a very powerful sensation, and give us the idea of saltness. Such, on the contrary, as are of a rounder figure, slide smoothly along the papillæ, and are perceived to be sweet. In this manner they have, with minute labour, gone through the variety of imagined forms in bodies, and have given them as imaginary effects. All we can precisely determine upon the nature of tastes is, that the bodies to be tasted must be either somewhat moistened, or, in some measure, dissolved by the saliva before they can produce a proper sensation: when both the tongue itself, and the body to be tasted, are extremely dry, no taste whatever ensues. The sensation is then changed; and the tongue, instead of tasting, can only be said, like any other part of the body, to feel the object.

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It is for this reason, that children have a stronger relish of tastes than those who are more advanced in life. This organ with them, from the greater moisture of their bodies, is kept in greater perfection; and is, consequently, better adapted to perform its functions. Every person remembers how great a pleasure he found in sweets, while a child; but his taste growing more obtuse, with age, he is obliged to use artificial means to excite it. It is then that he is found to call in the assistance of poignant sauces, and strong relishes, of salts and aromatics; all which the delicacy of his tender organ, in childhood, were unable to endure. His taste grows callous to the natural relishes; and is artificially formed to others more unnatural; so that the highest epicure may be said to have the most depraved taste; as it is owing to the bluntness of his organs that he is obliged to have recourse to such a variety of expedients, to gratify his appetite.

As smells are often rendered agreeable by habit, so also tastes may be. Tobacco, and coffee, so pleasing to many, are yet, at first, very disagreeable to all. It is not without perseverance that we begin to have a relish for them; we force nature so long, that what was constraint, in the beginning, at last becomes inclination.

The

The grossest, and yet the most useful of all the senses, is that of feeling. We are often seen to survive under the loss of the rest; but of this we can never be totally deprived, but with life. Although this sense is diffused over all parts of the body, yet it most frequently happens that those parts which are most exercised in touching, acquire the greatest degree of accuracy. Thus the fingers, by long habit, become greater masters in the art than any others, even where the sensation is more delicate and fine.* It is from this habit, therefore, and their peculiar formation, and not, as is supposed, from their being furnished with a greater quantity of nerves, that the fingers are thus perfectly qualified to judge of forms. Blind men, who are obliged to use them much oftner than we, have this sense much finer; so that the delicacy of the touch arises rather from the habit of constantly employing the fingers, than from any fancied nervousness in their conformation.

All animals that are furnished with hands,† seem to have more understanding than others. Monkeys have so many actions, like those of men, that they appear to have similar ideas of the form of bodies. All other creatures, deprived of hands,

* Buffon, vol. vi. p. 80.

† Buffon, vol. vi. p. 82.

hands, can have no distinct ideas of the shape of the objects, by which they are surrounded, as they want this organ, which serves to examine and measure their forms, their risings and depressions. A quadrupede probably conceives as erroneous an idea of any thing near him, as a child would of a rock, or a mountain, that it beheld at a distance. It may be for this reason, that we often see them frightened at things with which they ought to be better acquainted. Fishes, whose bodies are covered with scales, and who have no organs for feeling, must be the most stupid of all animals. Serpents, that are likewise destitute, are yet, by winding round several bodies, better capable of judging of their form. All these, however, can have but very imperfect ideas from feeling ; and we have already seen, when deprived of this sense, how little the rest of the senses are to be relied on.

The feeling, therefore, is the guardian, the judge, and the examiner of all the rest of the senses. It establishes their information, and detects their errors. All the other senses are altered by time, and contradict their former evidence ; but the touch still continues the same ; and though extremely confined in its operations, yet it is never found to deceive. The universe, to a man who had only used the rest
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of his senses, would be but a scene of illusion; every object misrepresented, and all its properties unknown. Mr. Buffon has imagined a man just newly brought into existence, describing the illusion of his first sensations, and pointing out the steps by which he arrived at reality. He considers him as just created, and awaking amidst the productions of Nature; and, to animate the narrative still more strongly, has made his philosophical man a speaker. The reader will no doubt recollect Adam's speech in Milton, as being similar. All that I can say to obviate the imputation of plagiarism is, that the one treats the subject more as a poet, the other more as a philosopher. The philosopher's man describes his first sensations in the following manner. *

I well remember that joyful anxious moment when I first became acquainted with my own existence. I was quite ignorant of what I was, how I was produced, or from whence I came. I opened my eyes: what an addition to my surprize! the light of the day, the azure vault of heaven, the verdure of the earth, the chrysal of the waters, all employed me at once, and animated and filled me with inexpressible delight. I at first imagined that all those
objects

* Buffon, vol. vi. p. 88.

objects were within me, and made a part of myself.

Impressed with this idea, I turned my eyes to the sun; its splendor dazzled and overpowered me: I shut them once more; and, to my great concern, I supposed that, during this short interval of darkness, I was again returning to nothing.

Afflicted, seized with astonishment, I pondered a moment on this great change, when I heard a variety of unexpected sounds. The whistling of the wind, and the melody of the grove, formed a concert, the soft cadence of which sunk upon my soul. I listened for some time, and was persuaded that all this music was within me.

Quite occupied with this new kind of existence, I had already forgotten the light which was my first inlet into life; when I once more opened my eyes, and found myself again in possession of my former happiness. The gratification of the two senses at once, was a pleasure too great for utterance.

I turned my eyes upon a thousand various objects: I soon found that I could lose them, and restore them at will; and amused myself more at leisure with a repetition of this new-made power.

I now

I now began to gaze without emotion, and to hearken with tranquility, when a light breeze, the freshness of which charmed me, wafted its perfumes to my sense of smelling, and gave me such satisfaction as even encreased my self-love.

Agitated, roused by the various pleasures of my new existence, I instantly arose, and perceived myself moved along, as if by some unknown and secret power.

I had scarce proceeded forward, when the novelty of my situation once more rendered me immoveable. My surprize returned; I supposed that every object around me had been in motion: I gave to them that agitation which I produced by changing place; and the whole creation seemed once more in disorder.

I lifted my hand to my head; I touched my forehead; I felt my whole frame: I then supposed that my hand was the principal organ of my existence; all its informations were distinct and perfect; and so superior to the senses I had yet experienced, that I employed myself for some time in repeating its enjoyments: every part of my person I touched, seemed to touch my hand in turn; and gave back sensation for sensation.

I soon found, that this faculty was expanded over the whole surface of my body;
and

and I now first began to perceive the limits of my existence, which I had in the beginning supposed spread over all the objects I saw.

Upon casting my eyes upon my body, and surveying my own form, I thought it greater than all the objects that surrounded me. I gazed upon my person with pleasure; I examined the formation of my hand, and all its motions; it seemed to me large or little in proportion as I carried it to my eyes; I brought it very near, and it then hid almost every other object from my sight. I began soon, however, to find that my sight gave me uncertain information, and resolved to depend upon my feeling for redress.

This precaution was of the utmost service; I renewed my motions, and walked forward with my face turned towards the heavens. I happened to strike lightly against a palm-tree, and this renewed my surprise: I laid my hand on this strange body; it seemed replete with new wonders, for it did not return me sensation for sensation, as my former feelings had done. I now, therefore, perceived that there was something external, and which did not make a part of my own existence.

I now, therefore, resolved to touch whatever I saw, and vainly attempted to touch
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the sun; I stretched forth my arm, and felt only yielding air: at every effort, I fell from one surprize into another, for every object appeared equally near me; and it was not till after an infinity of trials, that I found some objects further removed than the rest.

Amazed with the illusions, and the uncertainty of my state, I sat down beneath a tree; the most beautiful fruits hung upon it, within my reach; I stretched forth my hand, and they instantly separated from the branch. I was proud of being able to grasp a substance without me; I held them up, and their weight appeared to me like an animated power that endeavoured to draw them to the earth. I found a pleasure in conquering their resistance.

I held them near my eye; I considered their form and beauty; their fragrance still more allured me to bring them nearer; I brought them to my lips, and drank in their odours; the perfume invited my sense of tasting, and I soon tried a new sense—How new! how exquisite! Hitherto I had tasted only of pleasure; but now it was luxury. The power of tasting gave me the idea of possession.

Flattered with this new acquisition, I continued its exercise, till an agreeable languor stealing upon my mind, I felt all my limbs

limbs become heavy, and all my desires suspended. My sensations were now no longer vivid and distinct; but seemed to lose every object, and presented only feeble images, confusedly marked. At that instant I sunk upon the flowery bank, and slumber seized me. All now seemed once more lost to me. It was then as if I was returning into my former nothing. How long my sleep continued, I cannot tell; as I yet had no perception of time. My awaking appeared like a second birth; and I then perceived that I had ceased for a time to exist. This produced a new sensation of fear; and from this interruption in life, I began to conclude that I was not formed to exist for ever.

In this state of doubt and perplexity, I began to harbour new suspicions; and to fear that sleep had robbed me of some of my late powers; when, turning on one side, to resolve my doubts, what was my amazement, to behold another being, like myself, stretched by my side! New ideas now began to arise; new passions, as yet unperceived, with fears, and pleasures, all took possession of my mind, and prompted my curiosity: love served to complete that happiness, which was begun in the individual; and every sense was gratified in all its varieties.

C H A P. X.

Of old Age and Death.*

EVERY thing in nature has its improvement and decay. The human form is no sooner arrived at its state of perfection than it begins to decline. The alteration is, at first, insensible; and, often, several years are elapsed before we find ourselves grown old. The news of this disagreeable change, too generally, comes from without; and we learn from others that we grow old, before we are willing to believe the report.

When the body has come to its full height, and is extended into its just dimensions; it then also begins to receive an additional bulk, which rather loads than assists it. This is formed from fat; which generally, at the age of thirty-five, or forty, covers all the muscles, and interrupts their activity. Every action is then performed with great labour, and the encrease of size only serves as a forerunner of decay.

The bones, also, become every day more solid. In the embryo they are as soft almost as the muscles and the flesh; but, by

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degrees,

* This chapter is taken from Mr. Buffon, except where it is marked by inverted commas.

degrees, they harden, and acquire their natural vigour ; but still, however, the circulation is carried on through them ; and, how hard soever the bones may seem, yet the blood holds its current through them as through all other parts of the body. Of this we may be convinced, by an experiment, which was first accidentally discovered, by our ingenious countryman Mr. Belcher. Perceiving, at a friend's house, that the bones of hogs, which were fed upon madder, were red, he tried it upon various animals, by mixing this root with their usual food ; and he found that it tintured the bones in all : an evident demonstration that the juices of the body had a circulation through the bones. He fed some animals alternately upon madder and their common food, for some time, and he found their bones tintured with alternate layers, in conformity to their manner of living. From all this, he naturally concluded, that the blood circulated through the bones as it does through every other part of the body ; and that, how solid soever they seemed, yet, like the softest parts, they were furnished, through all their substance, with their proper canals. Nevertheless, these canals are of very different capacities, during the different stages of life. In infancy they are capacious ; and the blood flows almost

almost as freely through the bones as through any other part of the body ; in manhood their size is greatly diminished ; the vessels are almost imperceptible ; and the circulation through them is proportionably slow. But, in the decline of life, the blood, which flows through the bones, no longer contributing to their growth, must necessarily serve to encrease their hardness. The channels, that every where run through the human frame, may be compared to those pipes that we every where see crufted on the inside, by the water, for a long continuance, running through them. Both, every day grow less and less, by the small rigid particles which are deposited within them. Thus as the vessels are by degrees diminished, the juices, also, which were necessary for the circulation through them, are diminished in proportion ; till, at length, in old age, those props of the human frame are not only more solid but more brittle.

The cartilages, or gristles, which may be considered as bones beginning to be formed, grow also more rigid. The juices circulating through them, for there is a circulation through all parts of the body, every day contributes to render them harder ; so that these substances, which in youth are elastic, and pliant in age, become hard and bony. As these cartilages are

generally placed near the joints, the motion of the joints also, must, of consequence, become more difficult. Thus, in old age, every action of the body is performed with labour; and the cartilages, formerly so supple, will now sooner break than bend.

“As the cartilages acquire hardness, and unfit the joints for motion, so also that mucous liquor, which is always separated between the joints, and which serves, like oil to an hinge, to give them an easy and ready play, is now grown more scanty. It becomes thicker, and more clammy, more unfit for answering the purposes of motion; and from thence, in old age, every joint is not only stiff, but awkward. At every motion, this clammy liquor is heard to crack; and it is not without the greatest effort of the muscles that its resistance is overcome. I have seen an old person, that never moved a single joint that did not thus give notice of the violence that was done it.”

The membranes that cover the bones, the joints, and the rest of the body, become, as we grow old, more dense and more dry. These which surround the bones, soon cease to be ductile. The fibres, of which the muscles or flesh is composed, become every day more rigid; and, while to the touch the body seems, as we advance in
years,

years, to grow softer, it is, in reality, encreasing in hardness. It is the skin, and not the flesh, that we feel upon such occasions. The fat, and the flabbiness of that, seems to give an appearance of softness, which the flesh itself is very far from having. There are few can doubt this after trying the difference between the flesh of young and old animals. The first is soft and tender, the last is hard and dry.

The skin is the only part of the body that age does not contribute to harden. That stretches to every degree of tension ; and we have horrid instances of its pliancy, in many disorders incident to humanity. In youth, therefore, while the body is vigorous and encreasing, it still gives way to its growth. But, although it thus adapts itself to our encrease, it does not in the same manner conform to our decay. The skin, which in youth was filled, and glossy, when the body begins to decline, has not elasticity enough to shrink entirely with its diminution. It hangs, therefore, in wrinkles, which no art can remove. The wrinkles of the body, in general, proceed from this cause. But those of the face seem to proceed from another ; namely, from the many varieties of positions into which it is put by the speech, the food, or the passions. Every grimace, and every
passion

passion wrinkles up the visage into different forms. These are visible enough in young persons; but what at first was accidental, or transitory, becomes unalterably fixed in the visage as it grows older. "From hence we may conclude, that a freedom from passions not only adds to the happiness of the mind, but preserves the beauty of the face; and the person that has not felt their influence, is less strongly marked by the decays of nature."

Hence, therefore, as we advance in age, the bones, the cartilages, the membranes, the flesh, the skin, and every fibre of the body, becomes more solid, more brittle, and more dry. Every part shrinks, every motion becomes more slow; the circulation of the fluids is performed with less freedom; perspiration diminishes; the secretions alter; the digestion becomes slow and laborious; and the juices no longer serving to convey their accustomed nourishment, those parts may be said to live no longer when the circulation ceases. Thus the body dies by little and little; all its functions are diminished by degrees; life is driven from one part of the frame to another; universal rigidity prevails; and death at last seizes upon the little that is left.

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As the bones, the cartilages, the muscles, and all other parts of the body, are softer in women than in men, these parts must, of consequence require a longer time to come to that hardness which hastens death. Women, therefore, ought to be a longer time in growing old than men; and this is actually the case. If we consult the tables which have been drawn up respecting human life, we shall find, that after a certain age they are more long lived than men, all other circumstances the same. A woman of sixty has a better chance than a man of the same age to live till eighty. Upon the whole we may infer, that such persons as have been slow in coming up to maturity, will also be slow in growing old; and this holds as well with regard to other animals as to man.

The whole duration of the life of either vegetables, or animals, may be, in some measure, determined from their manner of coming to maturity. The tree, or the animal, which takes but a short time to encrease to its utmost pitch, perishes much sooner than such as are less premature. In both, the encrease upwards is first accomplished; and not till they have acquired their greatest degree of height do they begin to spread in bulk. Man grows in stature till about the age of seventeen; but his
body

body is not completely developed till about thirty. Dogs, on the other hand, are at their utmost size, in a year, and become as bulky as they usually are in another. However, man who is so long in growing continues to live for fourscore, or an hundred years; but the dog seldom above twelve, or thirteen. In general, also, it may be said that large animals live longer than little ones, as they usually take a larger time to grow. But in all animals one thing is equally certain, that they carry the causes of their own decay about them; and that their deaths are necessary and inevitable. The prospects which some visionaries have formed of perpetuating life by remedies, have been often enough proved false by their own example. Such unaccountable schemes would, therefore, have died with them, had not the love of life always augmented our credulity.

When the body is naturally well formed, it is possible to lengthen out the period of life for some years by management. Temperance in diet is often found conducive to this end. The famous Cornaro, who lived to above an hundred years, although his constitution was naturally feeble, is a strong instance of the benefit of an abstemious life. Moderation in the passions also may contribute to extend the term of our existence.

“ Fontenelle,

“ Fontenelle, the celebrated writer, was naturally of a very weak and delicate habit of body. He was affected by the smallest irregularities ; and had frequently suffered severe fits of illness from the slightest causes. But the remarkable equality of his temper, and his seeming want of passion, lengthened out his life to above an hundred. It was remarkable of him, that nothing could vex or make him uneasy ; every occurrence seemed equally pleasing ; and no event, however unfortunate, seemed to come unexpected.” However, the term of life can be prolonged but for a very little time by any art we can use. We are told of men who have lived beyond the ordinary duration of human existence ; such as Parr, who lived to an hundred and forty-four ; and Jenkins to an hundred and sixty-five ; yet these men used no peculiar arts to prolong life ; on the contrary, it appears that these, as well as some others, remarkable for their longevity, were peasants accustomed to the greatest fatigues, who had no settled rules of diet, but who often indulged in accidental excesses. Indeed, if we consider that the European, the Negroe, the Chinese, and the American, the civilized man, and the savage, the rich and the poor, the inhabitant of the city, and of the country, though all so different in other respects, are yet

yet entirely similar in the period allotted them for living; if we consider that neither the difference of race, of climate, of nourishment, of convenience, or of soil, makes any difference in the term of life; if we consider that those men who live upon raw flesh, or dried fishes, upon sago, or rice, upon cassava, or upon roots, nevertheless live as long as those who are fed upon bread and meat, we shall readily be brought to acknowledge, that the duration of life depends neither upon habit, customs, or the quantity of food; we shall confess, that nothing can change the laws of that mechanism which regulates the number of our years, and which can chiefly be affected only by long fasting, or great excess.

If there be any difference in the different periods of man's existence, it ought principally to be ascribed to the quality of the air. It has been observed, that in elevated situations there have been found more old people than in those that were low. The mountains of Scotland, Wales, Auvergne, and Switzerland, have furnished more instances of extreme old age than the plains of Holland, Flanders, Germany, or Poland. But, in general, the duration of life is nearly the same in most countries. Man, if not cut off by accidental diseases, is generally found

found to live to ninety or an hundred years. Our ancestors did not live beyond that date; and, since the times of David, this term has made but little alteration.

If we be asked how in the beginning men lived so much longer than at present, and by what means their lives were extended to nine hundred and thirty, or even nine hundred and sixty years, it may be answered, that the productions of the earth, upon which they fed, might be of a different nature at that time, from what they are at present. "It may be answered, that the term was abridged by Divine command, in order to keep the earth from being overstocked with human inhabitants; since, if every person were now to live and generate for nine hundred years, mankind would be encreased to such a degree, that there would be no room for subsistence: so that the plan of Providence would be altered; which is seen not to produce life, without providing a proper supply."

But, to whatever extent life may be prolonged, or however some may have delayed the effects of age, death is the certain goal to which all are hastening. All the causes of decay which have been mentioned, contribute to bring on this dreadful dissolution. However, nature approaches to this
awful

awful period, by flow and imperceptible degrees; life is consuming day after day; and some one of our faculties, or vital principles, is every hour dying before the rest; so that death is only the last shade in the picture: and it is probable, that man suffers a greater change in going from youth to age, than from age into the grave. When we first begin to live, our lives may scarcely be said to be our own; as the child grows, life encreases in the same proportion; and is at its height in the prime of manhood. But as soon as the body begins to decrease, life decreases also; for, as the human frame diminishes, and its juices circulate in smaller quantity, life diminishes and circulates with less vigour; so that as we begin to live by degrees, we begin to die in the same manner.

Why then should we fear death, if our lives have been such as not to make eternity dreadful! Why should we fear that moment which is prepared by a thousand other moments of the same kind! the first pangs of sickness being probably greater than the last struggles of departure. Death, in most persons, is as calmly endured as the disorder that brings it on. If we enquire from those whose business it is to attend the sick and the dying, we shall find that, except
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in a very few acute cases, where the patient dies in agonies, the greatest number die quietly, and seemingly without pain : and even the agonies of the former, rather terrify the spectators, than torment the patient; for how many have we not seen who have been accidentally relieved from this extremity, and yet had no memory of what they then endured. In fact, they had ceased to live, during that time when they ceased to have sensation ; and their pains were only those of which they had an idea.

The greatest number of mankind die, therefore, without sensation ; and of those few that still preserve their faculties entire to the last moment, there is scarce one of them that does not also preserve the hopes of still out-living his disorder. Nature, for the happiness of man, has rendered this sentiment stronger than his reason. A person dying of an incurable disorder, which he must know to be so, by frequent examples of his case ; which he perceives to be so, by the inquietude of all around him, by the tears of his friends, and the departure or the face of the physician, is, nevertheless, still in hopes of getting over it. His interest is so great, that he only attends to his own representations ; the judgment of others is considered as an hasty conclusion ;

conclusion ; and while death every moment makes new inroads upon his constitution, and destroys life in some part, hope still seems to escape the universal ruin, and is the last that submits to the blow.

Cast your eyes upon a sick man, who has an hundred times told you that he felt himself dying, that he was convinced he could not recover, and that he was ready to expire ; examine what passes on his visage, when, through zeal or indiscretion, any one comes to tell him that his end is at hand. You will see him change, like one who is told an unexpected piece of news. He now appears not to have thoroughly believed what he had been telling you himself ; he doubted much ; and his fears were greater than his hopes : but he still had some feeble expectations of living, and would not have seen the approaches of death, unless he had been alarmed by the mistaken assiduity of his attendants.

Death, therefore, is not that terrible thing which we suppose it to be. It is a spectre which frights us at a distance, but which disappears when we come to approach it more closely. Our ideas of its terrors are conceived in prejudice, and dressed up by fancy ; we regard it not only as the greatest misfortune, but as also an evil accompanied with

with the most excruciating tortures: we have even encreased our apprehensions, by reasoning on the extent of our sufferings. It must be dreadful, say some, since it is sufficient to separate the soul from the body; it must be long since our sufferings are proportioned to the succession of our ideas; and these being painful, must succeed each other with extreme rapidity. In this manner has false philosophy laboured to augment the miseries of our nature; and to aggravate that period, which nature has kindly covered with insensibility. Neither the mind nor the body, can suffer these calamities; the mind is, at that time, mostly without ideas; and the body too much enfeebled, to be capable of perceiving its pain. A very acute pain produces either death, or fainting, which is a state similar to death: the body can suffer but to a certain degree; if the torture becomes excessive, it destroys itself; and the mind ceases to perceive, when the body can no longer endure.

In this manner, excessive pain admits of no reflection; and wherever there are any signs of it, we may be sure that the sufferings of the patient are no greater than what we ourselves may have remembered to endure.

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But, in the article of death, we have many instances in which the dying person has shewn that very reflection that presupposes an absence of the greatest pain; and, consequently, that pang which ends life, cannot even be so great as those which have preceded. Thus, when Charles XII. was shot at the siege of Frederickshall, he was seen to clap his hand on the hilt of his sword; and although the blow was great enough to terminate one of the boldest and bravest lives in the world, yet it was not painful enough to destroy reflection. He perceived himself attacked; he reflected that he ought to defend himself, and his body obeyed the impulse of his mind, even in the last extremity. Thus it is the prejudice of persons in health, and not the body in pain, that makes us suffer from the approach of death: we have, all our lives, contracted an habit of making out excessive pleasures and pains; and nothing but repeated experience shews us, how seldom the one can be suffered, or the other enjoyed to the utmost.

If there be any thing necessary to confirm what we have said, concerning the gradual cessation of life, or the insensible approaches of our end, nothing can more effectually prove it, than the uncertainty of the signs of death. If we consult what Winslow or Bruhier

Bruhier have said upon this subject, we shall be convinced, that between life and death, the shade is so very undistinguishable, that even all the powers of art can scarcely determine where the one ends, and the other begins. The colour of the visage, the warmth of the body, the suppleness of the joints, are but uncertain signs of life still subsisting; while, on the contrary, the paleness of the complexion, the coldness of the body, the stiffness of the extremities, the cessation of all motion, and the total insensibility of the parts, are but uncertain marks of death begun. In the same manner also, with regard to the pulse, and the breathing, these motions are often so kept under, that it is impossible to perceive them. By placing a looking-glass to the mouth of the person supposed to be dead, people often expect to find whether he breathes or not. But this is a very uncertain experiment: the glass is frequently sullied by the vapour of the dead man's body; and often the person is still alive, although the glass is no way tarnished. In the same manner, neither burning, nor scarifying, neither noises in the ears, nor pungent spirits applied to the nostrils, give certain signs of the discontinuance of life; and there are many instances of persons who have endured them all, and afterwards recovered, without any

external assistance, to the astonishment of the spectators. How careful, therefore, should we be, before we commit those who are dearest to us to the grave, to be well assured of their departure: experience, justice, humanity, all persuade us not to hasten the funerals of our friends, but to keep their bodies unburied, until we have certain signs of their real decease.



CHAP.

CHAP. XI.

Of the Varieties in the Human Race.

HITHERTO we have compared man with other animals; we now come to compare men with each other. We have hitherto considered him as an individual, endowed with excellencies above the rest of the creation; we now come to consider the advantages which men have over men, and the various kinds with which our earth is inhabited.

If we compare the minute differences of mankind, there is scarce one nation upon the earth that entirely resembles another; and there may be said to be as many different kinds of men as there are countries inhabited. One polished nation does not differ more from another, than the merest savages do from those savages that lie even contiguous to them; and it frequently happens that a river, or a mountain, divides two barbarous tribes that are unlike each other in manners, customs, features, and complexion. But these differences, however perceivable, do not form such distinctions as come within a general picture of the varieties of mankind. Custom, accident, or

fashion, may produce considerable alterations in neighbouring nations; their being derived from ancestors of a different climate, or complexion, may contribute to make accidental distinctions, which every day grow less; and it may be said, that two neighbouring nations, how unlike soever at first, will assimilate by degrees; and, by long continuance, the difference between them will at last become almost imperceptible. It is not, therefore, between contiguous nations we are to look for any strong marked varieties in the human species; it is by comparing the inhabitants of opposite climates, and distant countries; those who live within the polar circle with those beneath the equator; those that live on one side of the globe with those that occupy the other.

Of all animals, the differences between mankind are the smallest. Of the lower races of creatures, the changes are so great as often entirely to disguise the natural animal, and to distort, or to disfigure its shape. But the chief differences in man are rather taken from the tincture of his skin than the variety of his figure; and in all climates he preserves his erect deportment, and the marked superiority of his form. If we look round the world, there seem to be not above six distinct varieties



J. Lodge sculp.

The Laplander.

rieties in the human species, each of which is strongly marked, and speaks the kind seldom to have mixed with any other.* But there is nothing in the shape, nothing in the faculties, that shews their coming from different originals; and the varieties of climate, of nourishment, and custom, are sufficient to produce every change.

The first distinct race of men is found round the polar regions. The Laplanders, the Esquimaux Indians, the Samoeid Tartars, the inhabitants of Nova Zembla, the Borandians, the Greenlanders, and the natives of Kamskatka, may be considered as one peculiar race of people, all greatly resembling each other in their stature, their complexion, their customs, and their ignorance. These nations being under a rigorous climate, where the productions of nature are but few, and the provisions coarse and unwholesome, their bodies have shrunk to the nature of their food; and their complexions have suffered, from cold, almost a similar change to what heat is known to produce; their colour being a deep brown, in some places inclining to actual blackness. These, therefore, in general, are found to be a race of short stature, and odd shape, with countenances
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* I have taken four of these varieties from Linnæus; those of the Laplanders and Tartars from Mr. Buffon.

as savage as their manners are barbarous. The visage, in these countries, is large and broad, the nose flat and short, the eyes of a yellowish brown, inclining to blackness, the eye-lids drawn towards the temples, the cheek-bones extremely high, the mouth very large, the lips thick and turned outwards, the voice thin and squeaking, the head large, the hair black and straight, the colour of the skin of a dark greyish.* They are short in stature, the generality not being above four feet high, and the tallest not above five. Among all these nations the women are as deformed as the men, and resemble them so nearly, that one cannot, at first, distinguish the sexes among them.

These nations not only resemble each other in their deformity, their dwarfishness, the colour of their hair and eyes, but they have all, in a great measure, the same inclinations, and the same manners, being all equally rude, superstitious, and stupid. The Danish Laplanders have a large black cat, to which they communicate all their secrets, and consult in all their affairs. Among the Swedish Laplanders there is in every family a drum, for consulting the devil; and, although these nations are robust, and nimble, yet they are so cowardly, that

* Krantz.

that they never can be brought into the field. Gustavus Adolphus attempted to make a regiment of Laplanders, but he found it impossible to accomplish his design; for it should seem that they can live only in their own country, and in their own manner. They make use of skates, which are made of fir, of near three feet long, and half a foot broad; these are pointed, and raised before, and tyed to the foot by straps of leather. With these they skate upon the icy snow with such velocity, that they very easily overtake the swiftest animals. They make use also of a pole, pointed with iron at one end, and rounded at the other. This pole serves to push them along, to direct their course, to support them from falling, to stop the impetuosity of their motion, and to kill that game which they have overtaken. Upon these skates they descend the steepest mountains, and scale the most craggy precipices; and, in these exercises, the women are not less skilful than the men. They have all the use of the bow and arrow, which seems to be a contrivance common to all barbarous nations; and which, however, at first, required no small skill to invent. They launce a javelin also, with great force; and some say that they can hit a mark, no larger than a crown, at thirty yards distance, and with such

such force as would pierce a man through. They are all hunters; and particularly pursue the ermine, the fox, the ounce, and the martin, for the sake of their skins. These they barter, with their southern neighbours, for brandy and tobacco; both which they are fond of to excess. Their food is principally dried fish, the flesh of rein-deer and bears. Their bread is composed of the bones of fishes, pounded and mixed with the inside tender bark of the pine tree. Their drink is train-oil, or brandy, and, when deprived of these, water, in which juniper berries have been infused. With regard to their morals, they have all the virtues of simplicity, and all the vices of ignorance. They offer their wives and daughters to strangers; and seem to think it a particular honour if their offer be accepted. They have no idea of religion, or a Supreme Being; the greatest number of them are idolaters; and their superstition is as profound as their worship is contemptible. Wretched and ignorant as they are, yet they do not want pride; they set themselves far above the rest of mankind; and Krantz assures us, that when the Greenlanders are got together, nothing is so customary among them as to turn the Europeans into ridicule. They are obliged,
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indeed, to yield them the pre-eminence in understanding, and mechanic arts; but they do not know how to set any value upon these. They therefore count themselves the only civilized and well-bred people in the world; and it is common with them, when they see a quiet, or a modest stranger, to say that he is almost as well bred as a Greenlander.

From this description, therefore, this whole race of people may be considered as distinct from any other. Their long continuance in a climate the most inhospitable, their being obliged to subsist on food the most coarse and ill-prepared, the savageness of their manners, and their laborious lives, all have contributed to shorten their stature, and to deform their bodies.* In proportion as we approach towards the north pole, the size of the natives appears to diminish, growing less and less as we advance higher, till we come to those latitudes that are destitute of all inhabitants whatsoever.

The wretched natives of these climates seem fitted by nature to endure the rigours of their situation. As their food is but scanty and precarious, their patience in hunger is amazing.† A man, who has eat nothing for four days, can manage his little

* Ellis's Voyage, p. 256. † Krantz, p. 134, vol. i.

little canoe, in the most furious waves, and calmly subsist in the midst of a tempest, that would quickly dash an European boat to pieces. Their strength is not less amazing than their patience; a woman among them will carry a piece of timber, or a stone, near double the weight of what an European can lift. Their bodies are of a dark grey all over; and their faces brown, or olive. The tincture of their skins partly seems to arise from their dirty manner of living, being generally daubed with train-oil; and partly from the rigours of climate, as the sudden alterations of cold and raw air in winter, and of burning heats in summer, shade their complexions by degrees, till, in a succession of generations, they at last become almost black. As the countries in which these reside are the most barren, so the natives seem the most barbarous of any part of the earth. Their more southern neighbours of America, treat them with the same scorn that a polished nation would treat a savage one; and we may readily judge of the rudeness of those manners, which even a native of Canada can think more barbarous than his own.

But the gradations of nature are imperceptible; and, while the north is peopled with such miserable inhabitants, there are here and there to be found, upon the edges
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of these regions, people of larger stature, and completer figure. A whole race of the dwarfish breed is often found to come down from the north, and settle more to the southward; and, on the contrary, it sometimes happens that southern nations are seen higher up, in the midst of these diminutive tribes, where they have continued for time immemorial. Thus the Ostiac Tartars seem to be a race that have travelled down from the north, and to be originally sprung from the minute savages we have been describing. There are also Norwegians, and Finlanders, of proper stature, who are seen to inhabit in latitudes higher even than Lapland. These, however, are but accidental migrations, and serve as shades to unite the distinct varieties of mankind.

The second great variety, in the human species, seems to be that of the Tartar race; from whence, probably, the little men we have been describing originally proceeded. The Tartar country, taken in general, comprehends the greatest part of Asia; and is, consequently, a general name given to a number of nations, of various forms and complexions. But, however they seem to differ from each other, they all agree in being very unlike the people of any other country whatsoever. All these nations have
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the upper part of the visage very broad, and wrinkled even while yet in their youth. Their noses are short and flat, their eyes little and sunk in their heads; and, in some of them, they are seen five or six inches asunder. Their cheek-bones are high, the lower part of their visage narrow, the chin long and advanced forward, their teeth of an enormous size, and growing separate from each other, their eye-brows thick and large and covering their eyes, their eye-lids thick, the face broad and flat, the complexion olive coloured, and the hair black. They are of a middle size, extremely strong, and very robust. They have but little beard, which grows straglingly on the chin. They have large thighs, and short legs. The ugliest of all are the Calmucks, in whose appearance there seems to be something frightful. They all lead an erratic life, remaining under tents of hair, or skins. They live upon horse flesh and that of camels, either raw or a little sodden between the horse and the saddle. They eat also fish dried in the sun. Their most usual drink is mares milk fermented with millet ground into meal. They all have the head shaven, except a lock of hair, on the top, which they let grow sufficiently long to form into tresses, on each side of the face. The



J. Lodge sculp.

The Chinese.

The women, who are as ugly as the men, wear their hair, which they bind up with bits of copper and other ornaments of a like nature. The majority of these nations have no religion, no settled notions of morality, no decency of behaviour. They are chiefly robbers: and the natives of Dagestan, who live near their more polished neighbours, make a traffic of Tartar slaves who have been stolen, and sell them to the Turks and the Persians. Their chief riches consist in horses, of which perhaps there are more in Tartary, than in any other part of the world. The natives are taught by custom to live in the same place with their horses; they are continually employed in managing them, and at last bring them to such great obedience, that the horse seems actually to understand the rider's intention.

To this race of men also, we must refer the Chinese and the Japanese, however different they seem in their manners and ceremonies. It is the form of the body that we are now principally considering; and there is, between these countries, a surprising resemblance. It is in general allowed that the Chinese have broad faces, small eyes, flat noses, and scarce any beard; that they are broad and square shouldered, and rather less in stature than Europeans. These
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are marks common to them and the Tartars, and they may, therefore, be considered as being derived from the same original. "I have observed," says Chardin, "that in all the people from the east and the north of the Caspian sea, to the peninsula of Malacca, that the lines of the face, and the formation of the visage, is the same. This has induced me to believe, that all these nations are derived from the same original, however different either their complexions or their manners may appear : for as to the complexion, that proceeds entirely from the climate and the food ; and as to the manners, these are generally the result of their different degrees of wealth or power." That they come from one stock, is evident also, from this ; that the Tartars who settle in China, quickly resemble the Chinese ; and, on the contrary, the Chinese who settle in Tartary, soon assume the figure, and the manners, of the Tartars.

The Japanese so much resemble the Chinese, that one cannot hesitate to rank them in the same class. They only differ in being rather browner, as they inhabit a more southern climate. They are, in general, described, as of a brown complexion, a short stature, a broad flat face, a very little beard, and black hair. Their customs and ceremonies are nearly the same ; their
ideas

ideas of beauty similar ; and their artificial deformities of blackening the teeth, and bandaging the feet, entirely alike in both countries. They both, therefore, proceed from the same stock ; and although they differ very much from their brutal progenitors, yet they owe their civilization wholly to the mildness of the climate in which they reside, and to the peculiar fertility of the soil. To this tribe also, we may refer the Cochin Chinese, the Siamese, the Tonquinese, and the inhabitants of Aracan, Laos, and Pegu, who, though all differing from the Chinese, and each other, nevertheless, have too strong a resemblance, not to betray their common original.

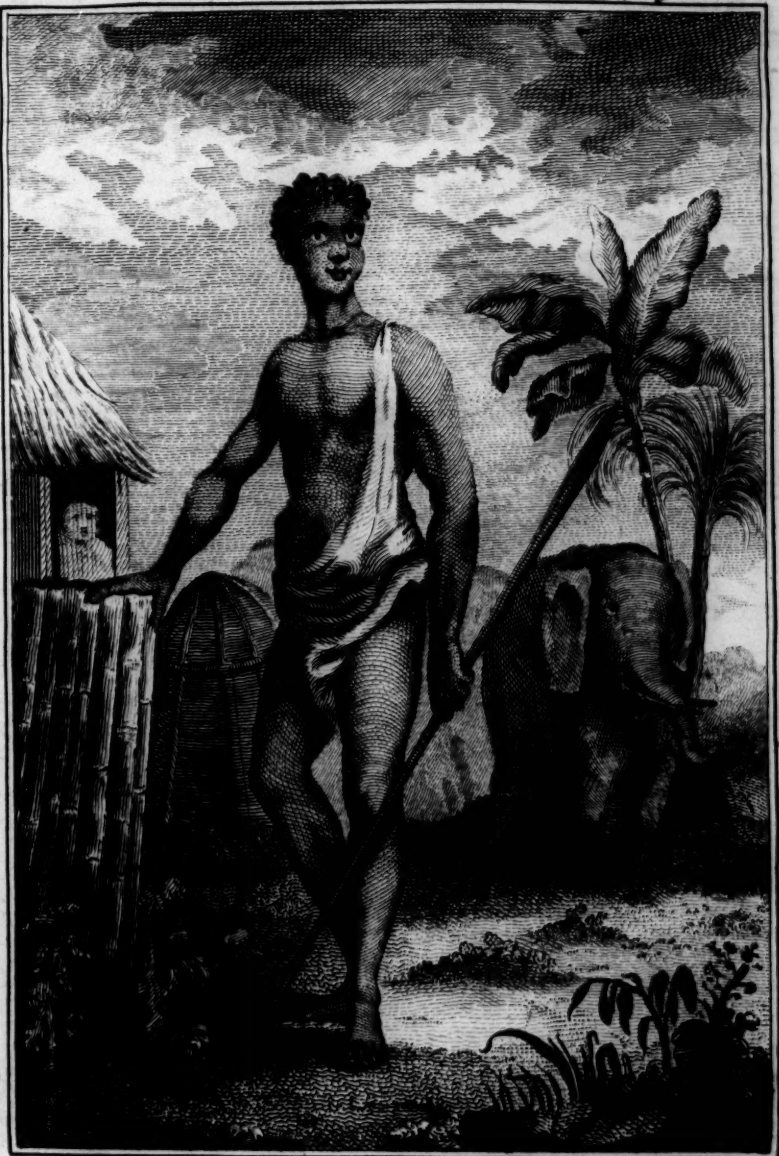
Another, which makes the third variety in the human species, is that of the southern Asiatics ; the form of whose features and persons may be easily distinguished from those of the Tartar races. The nations that inhabit the peninsula of India, seem to be the principal stock from whence the inhabitants of the islands that lie scattered in the Indian ocean, have been peopled. They are, in general, of a slender shape, with long straight black hair, and often with Roman noses. Thus they resemble the Europeans in stature and features ; but greatly differ in colour and habit of body. The
Indians

Indians are of an olive colour, and, in the more southern parts, quite black ; although the word Mogul, in their language, signifies a white man. The women are extremely delicate, and bathe very often : they are of an olive colour, as well as the men ; their legs and thighs are long, and their bodies short, which is the opposite to what is seen among the women of Europe. They are, as I am assured, by no means so fruitful as the European women ; but they feel the pains of child-birth with much less sensibility, and are generally up and well the day following. In fact, these pains seem greatest in all countries where the women are most delicate, or the constitution enfeebled by luxury or indolence. The women of savage nations seem, in a great measure, exempt from painful labours ; and even the hard working wives of the peasants among ourselves, have this advantage, from a life of industry, that their child-bearing is less painful. Over all India, the children arrive sooner at maturity, than with us of Europe. They often marry, and consummate, the husband at ten years old, and the wife at eight ; and they frequently have children at that age. However, the women who are mothers so soon, cease bearing before they are arrived at thirty ; and, at that time, they appear wrinkled, and seem
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marked with all the deformities of age. The Indians have long been remarkable for their cowardice and effeminacy; every conqueror that has but attempted the invasion of their country, having succeeded. The warmth of the climate entirely influences their manners; they are slothful, submissive and luxurious: satisfied with sensual happiness alone, they find no pleasure in thinking; and contented with slavery, they are ready to obey any master. Many tribes among them eat nothing that has life; they are fearful of killing the meanest insect, and have even erected hospitals for the maintenance of all kinds of vermin. The Asiatic dress also, is a loose flowing garment, rather fitted for the purposes of peace and indolence, than of industry or war. The vigour of the Asiatics is therefore in general conformable to their dress and nourishment: fed upon rice, and cloathed in effeminate silk vestments, their soldiers are unable to oppose the onset of an European army; and, from the times of Alexander to the present day, we have scarce any instances of their success in arms. Upon the whole, therefore, they may be considered as a feeble race of sensualists, too dull to find rapture in any pleasures, and too indolent to turn their gravity into wisdom.

To this class we may refer the Persians and Arabians, and, in general, the inhabitants of the islands that lie scattered in the Indian ocean.

The fourth striking variety in the human species, is to be found among the Negroes of Africa. This gloomy race of mankind is found to blacken all the southern parts of Africa, from eighteen degrees north of the line, to its extreme termination at the Cape of Good Hope. I know it is said, that the Caffres, who inhabit the southern extremity of that large continent, are not to be ranked among the Negroe race; however, the difference between them, in point of colour and features, is so small, that they may very easily be grouped in this general picture; and in the one or two that I have seen, I could perceive not the smallest difference. Each of the Negroe nations, it must be owned, differ among each other; they have their peculiar countries for beauty, like us; and different nations, as in Europe, pride themselves upon the regularity of their features. Those of Guinea, for instance, are extremely ugly, and have an insupportable scent; those of Mosambique, are reckoned beautiful, and have no ill smell whatsoever. The Negroes, in general, are of a black colour, with a smooth soft skin. This smoothness proceeds from the downy softness



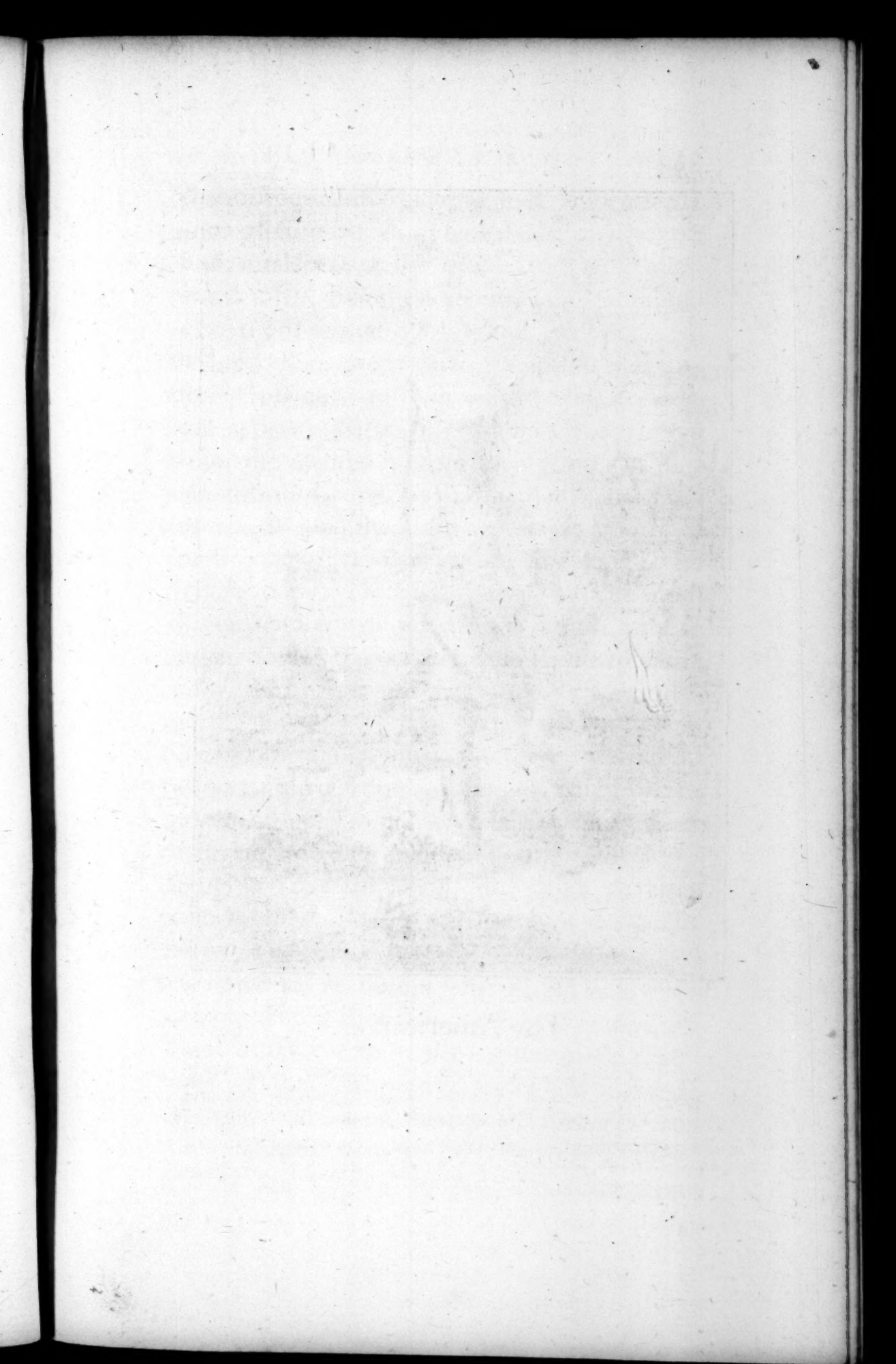
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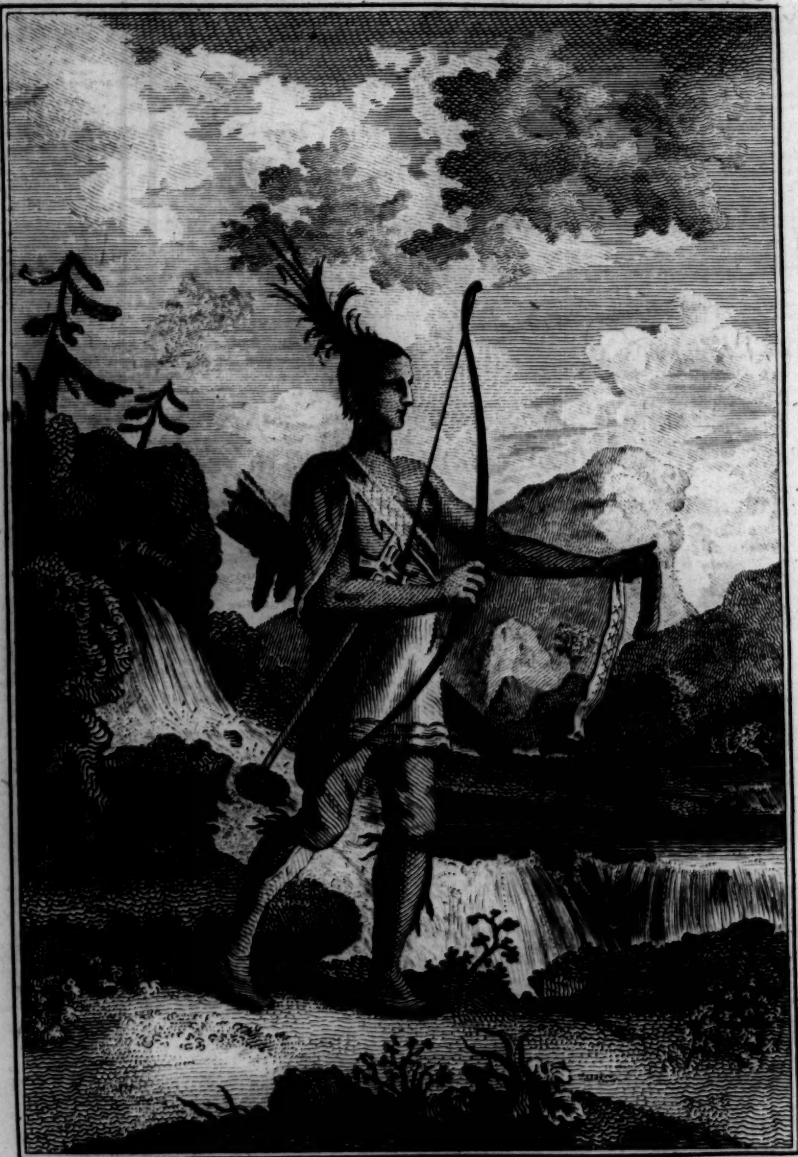
The African.

softness of the hair which grows upon it; the strength of which gives a roughness to the feel, in those of a white complexion. Their skins, therefore, have a velvet smoothness, and seem less braced upon the muscles than ours. The hair of their heads differs entirely from what we are accustomed to, being soft, woolly, and short. The beard also, partakes of the same qualities: but in this it differs, that it soon turns grey, which the hair is seldom found to do; so that several are seen with white beards, and black hair, at the same time. Their eyes are generally of a deep hazle; their noses flat and short; their lips thick and tumid; and their teeth of an ivory whiteness. This their only beauty, however, is set off by the colour of their skin; the contrast between the black and white being the more observable. It is false to say that their features are deformed by art; since, in the Negroe children born in European countries, the same deformities are seen to prevail; the same flatness in the nose; and the same prominence in the lips. They are, in general, said to be well shaped; but of such as I have seen, I never found one that might be justly called so; their legs being mostly ill formed, and most commonly bending outward on the shin-bone. But it is not only in those parts of their bodies that

are obvious, that they are disproportioned; those parts which among us are usually concealed by dress, with them are large and languid.* The women's breasts, after bearing one child, hang down below the navel; and it is customary with them to suckle the child at their backs, by throwing the breast over the shoulder. As their persons are thus naturally deformed, at least to our imaginations, their minds are equally incapable of strong exertions. The climate seems to relax their mental powers still more than those of the body; they are, therefore, in general, found to be stupid, indolent, and mischievous. The Arabians themselves, many colonies of whom have migrated southward into the most inland parts of Africa, seem to have degenerated from their ancestors; and forgetting their ancient learning, with their beauty, have become a race scarce any way distinguishable from the original natives. Nor does it seem to have fared otherwise with the Portuguese, who, about two centuries ago, settled along this coast. They also are become almost as black as the Negroes;

* Linnæus, in prima linea sua, fœminas Africanas depingit sicut aliquid deforme in parte genitali gestantes, quod sinum pudoris nuncupat. Attamen nihil different a nostratibus in hac parte, nisi quod labia pudendæ sint aliquantulum tumidiora. In hominibus etiam penis est longior et multo laxior.





B. West del.

J. N. Lodge sculp.

The American.

Negroes; and are said, by some, to be even more barbarous.

The inhabitants of America make a fifth race, as different from all the rest in colour, as they are distinct in habitation. The natives of America (except in the northern extremity, where they resemble the Laplanders) are of a red or copper colour; and although, in the old world, different climates produce a variety of complexions and customs, the natives of the new continent seem to resemble each other in almost every respect. They are all nearly of one colour; all have black thick strait hair, and thin black beards; which, however, they take care to pluck out by the roots. They have, in general, flat noses, with high cheek bones, and small eyes; and these deformities of nature they endeavour to encrease by art: they flatten the nose, and often the whole head of their children, while the bones are yet susceptible of every impression. They paint the body and face of various colours, and consider the hair upon any part of it, except the head, as a deformity which they are careful to eradicate. Their limbs are generally slihter made than those of the Europeans; and I am assured they are far from being so strong. All these savages seem to be cowardly; they seldom are known to face their enemies
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in the field, but fall upon them at an advantage; and the greatness of their fears serves to encrease the rigours of their cruelty. The wants which they often sustain, makes them surprizingly patient in adversity; distress, by being grown familiar, becomes less terrible; so that their patience is less the result of fortitude than of custom. They have all a serious air, although they seldom think; and, however cruel to their enemies, are kind and just to each other. In short, the customs of savage nations in every country are almost the same; a wild, independent, and precarious life, produces a peculiar train of virtues and vices: and patience and hospitality, indolence and rapacity, content and sincerity, are found not less among the natives of America, than all the barbarous nations of the globe.

The sixth and last variety of the human species, is that of the Europeans, and the nations bordering on them. In this class we may reckon the Georgians, Circassians, and Mingrelians, the inhabitants of Asia Minor, and the northern parts of Africa, together with a part of those countries which lie north-west of the Caspian sea. The inhabitants of these countries differ a good deal from each other; but they generally agree in the colour of their bodies,
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the beauty of their complexions, the largeness of their limbs, and the vigour of their understandings. Those arts which might have had their invention among the other races of mankind, have come to perfection there. In barbarous countries, the inhabitants go either naked, or are awkwardly cloathed in furs or feathers; in countries semi-barbarous, the robes are loose and flowing; but here the cloathing is less made for shew than expedition, and unites, as much as possible, the extremes of ornament and dispatch.

To one or other of these classes, we may refer the people of every country; and as each nation has been less visited by strangers, or has had less commerce with the rest of mankind, we find their persons, and their manners, more strongly impressed with one or other of the characters mentioned above. On the contrary, in those places where trade has long flourished, or where enemies have made many incursions, the races are usually found blended, and properly fall beneath no one character. Thus, in the islands of the Indian ocean, where a trade has been carried on for time immemorial, the inhabitants appear to be a mixture of all the nations upon the earth; white, olive, brown, and black men, are all seen living together in the same city, and propagate

gate a mixed breed, that can be referred to none of the classes into which naturalists have thought proper to divide mankind.

Of all the colours by which mankind is diversified, it is easy to perceive, that ours is not only the most beautiful to the eye, but the most advantageous. The fair complexion seems, if I may so express it, as a transparent covering to the soul; all the variations of the passions, every expression of joy or sorrow, flows to the cheek, and, without language, marks the mind. In the slightest change of health also, the colour of the European face is the most exact index, and often teaches us to prevent those disorders that we do not as yet perceive: not but that the African black, and the Asiatic olive complexions, admit of their alterations also; but these are neither so distinct, nor so visible, as with us; and, in some countries, the colour of the visage is never found to change; but the face continues in the same settled shade in shame, and in sickness, in anger, and despair.

The colour, therefore, most natural to man, ought to be that which is most becoming; and it is found, that, in all regions, the children are born fair, or at least red, and that they grow more black, or tawny, as they advance in age. It should
seem,

seem, consequently, that man is naturally white; since the same causes that darken the complexion in infants, may have originally operated, in flower degrees, in blackening whole nations. We could, therefore, readily account for the blackness of different nations, did we not see the Americans, who live under the line, as well as the natives of Negroland, of a red colour, and but a very small shade darker than the natives of the northern latitudes, in the same continent. For this reason, some have sought for other causes of blackness than the climate; and have endeavoured to prove that the blacks are a race of people, bred from one man, who was marked with accidental blackness. This, however, is but mere ungrounded conjecture; and, although the Americans are not so dark as the Negroes, yet we must still continue in the ancient opinion, that the deepness of the colour proceeds from the excessive heat of the climate. For, if we compare the heats of Africa with those of America, we shall find they bear no proportion to each other. In America, all that part of the continent which lies under the line, is cool and pleasant, either shaded by mountains, or refreshed by breezes from the sea. But, in Africa, the wide tract of country that lies under the line is very extensive,

tensive, and the soil sandy; the reflexion of the sun, therefore, from so large a surface of earth, is almost intolerable; and it is not to be wondered at, that the inhabitants should bear, in their looks, the marks of the inhospitable climate. In America, the country is but thinly inhabited; and the more torrid tracts are generally left desert by the inhabitants; for which reason they are not so deeply tinged by the beams of the sun. But in Africa the whole face of the country is fully peopled; and the natives are obliged to endure their situation, without a power of migration. It is there, consequently, that they are in a manner tied down to feel all the severity of the heat; and their complexions take the darkest hue they are capable of receiving. We need not, therefore, have recourse to any imaginary propagation, from persons accidentally black, since the climate is a cause obvious, and sufficient to produce the effect.

In fact, if we examine the complexions of different countries, we shall find them darken in proportion to the heat of their climate; and the shades gradually to deepen as they approach the line. Some nations, indeed, may be found not so much tinged by the sun as others, although they lie nearer the line. But this ever proceeds
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from some accidental causes ; either from the country lying higher, and consequently being colder ; or from the natives bathing oftener, and leading a more civilized life. In general, it may be asserted, that, as we approach the line, we find the inhabitants of each country grow browner, until the colour deepens into perfect blackness. Thus taking our standard from the whitest race of people, and beginning with our own country, which, I believe, bids fairest for the pre-eminence, we shall find the French, who are more southern, a slight shade deeper than we ; going farther down, the Spaniards are browner than the French ; the inhabitants of Fez darker than they ; and the natives of Negroland the darkest of all. In what manner the sun produces this effect, and how the same luminary which whitens wax and linen, should darken the human complexion, is not easy to conceive. Sir Thomas Brown first supposed that a mucous substance, which had something of a vitriolic quality, settled under the reticular membrane, and grew darker with heat. Others have supposed that the blackness lay in the epidermis, or scarf skin, which was burnt up like leather. But nothing has been satisfactorily discovered upon the subject ; it is sufficient that we are assured of the fact ; and that we have no doubt of the sun's

sun's tinging the complexion in proportion to its vicinity.

But we are not to suppose that the sun is the only cause of darkening the skin; the wind, extreme cold, hard labour, or coarse and sparing nourishment, are all found to contribute to this effect. We find the peasants of every country, who are most exposed to the weather, a shade darker than the higher ranks of people. The savage inhabitants of all places are exposed still more, and, therefore, contract a still deeper hue; and this will account for the tawny colour of the North American Indians. Although they live in a climate the same, or even more northerly than ours, yet they are found to be of complexions very different from those of Europe. But it must be considered that they live continually exposed to the sun; that they use many methods to darken their skins by art, painting them with red oker, and anointing them with the fat of bears. Had they taken, for a succession of several generations, the same precautions to brighten their colour that an European does, it is very probable that they would in time come to have similar complexions; and, perhaps, dispute the prize of beauty.

The extremity of cold is not less productive of a tawny complexion than that
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of heat. The natives of the arctic circle, as was observed, are all brown ; and those that lie most to the north are almost entirely black. In this manner both extremes are unfavourable to the human form and colour, and the same effects are produced under the poles that are found at the line.

With regard to the stature of different countries, that seems chiefly to result from the nature of the food, and the quantity of the supply. Not but that the severity of heat or cold, may, in some measure diminish the growth, and produce a dwarfishness of make. But, in general, the food is the great agent in producing this effect ; where that is supplied in large quantities, and, where its quality is wholesome and nutrimental, the inhabitants are generally seen above the ordinary stature. On the contrary, where it is afforded in a sparing quantity, or very coarse, and void of nourishment in its kind, the inhabitants degenerate, and sink below the ordinary size of mankind. In this respect they resemble other animals, whose bodies, by proper feeding, may be greatly augmented. An ox, on the fertile plains of India, grows to a size four times as large as the diminutive animal of the same kind bred in the Alps. The horses bred in the plains are larger than those of the mountain.

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So it is with man ; the inhabitants of the valley are usually found taller than those of the hill : the natives of the Highlands of Scotland, for instance, are short, broad, and hardy ; those of the Lowlands are tall and shapely. The inhabitants of Greenland, who live upon dried fish and seals, are less than those of Gambia or Senegal, where Nature supplies them with vegetable and animal abundance.

The form of the face seems rather to be the result of custom. Nations who have long considered some artificial deformity as beautiful, who have industriously lessened the feet, or flattened the nose, by degrees, begin to receive the impression they are taught to assume ; and Nature, in a course of ages, shapes itself to the constraint, and assumes hereditary deformity. We find nothing more common in births than for children to inherit sometimes even the accidental deformities of their parents. We have many instances of squinting in the father, which he received from fright, or habit, communicated to the offspring ; and I myself have seen a child distinctly marked with a scar, similar to one the father had received in battle. In this manner accidental deformities may become natural ones ; and by assiduity may be continued,
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and even encreased, through successive generations. From this, therefore, may have arisen the small eyes and long ears of the Tartars, and Chinese nations. From hence originally may have come the flat noses of the blacks, and the flat heads of the American Indians.

In this slight survey, therefore, I think we may see that all the variations in the human figure, as far as they differ from our own, are produced either by the rigour of the climate, the bad quality, or the scantiness of the provisions, or by the savage customs of the country. They are actual marks of the degeneracy in the human form; and we may consider the European figure and colour as standards to which to refer all other varieties, and with which to compare them. In proportion as the Tartar or American approaches nearer to European beauty, we consider the race as less degenerated; in proportion as he differs more widely, he has made greater deviations from his original form.

That we have all sprung from one common parent, we are taught, both by reason and religion, to believe; and we have good reason also to think that the Europeans resemble him more than any of the rest of his children. However, it must not be concealed

concealed that the olive-coloured Asiatic, and even the jet black Negroe, claim this honour of hereditary resemblance; and assert that white men are mere deviations from original perfection. Odd as this opinion may seem, they have got Linnæus, the celebrated naturalist, on their side; who supposes man a native of the tropical climates, and only a sojourner more to the north. But, not to enter into a controversy upon a matter of a very remote speculation, I think one argument alone will suffice to prove the contrary, and shew that the white man is the original source from whence the other varieties have sprung. We have frequently seen white children produced from black parents, but have never seen a black offspring the production of two whites. From hence we may conclude that whiteness is the colour to which mankind naturally tends; for, as in the tulip, the parent stock is known by all the artificial varieties breaking into it; so in man, that colour must be original which never alters, and to which all the rest are accidentally seen to change. I have seen in London, at different times, two white Negroes, the issue of black parents, that served to convince me of the truth of this theory. I had before been
taught

taught to believe that the whiteness of the Negroe skin was a disease, a kind of milky whiteness, that might be called rather a leprous crust than a natural complexion. I was taught to suppose that the numberless white Negroes, found in various parts of Africa, the white men that go by the name of Chacrelas, in the East-Indies, and the white Americans, near the Isthmus of Darien, in the West Indies, were all as so many diseased persons, and even more deformed than the blackest of the natives. But, upon examining that Negroe which was last shewn in London, I found the colour to be exactly like that of an European; the visage white and ruddy, and the lips of the proper redness. However, there were sufficient marks to convince me of its descent. The hair was white and woolly, and very unlike any thing I had seen before. The iris of the eye was yellow, inclining to red; the nose was flat, exactly resembling that of a Negroe; and the lips thick, and prominent. No doubt, therefore, remained of the child's having been born of Negroe parents; and the person who shewed it had attestations to convince the most incredulous. From this then we see that the variations of the Negroe colour is into whiteness,

ness, whereas the white are never found to have a race of Negroe children. Upon the whole, therefore, all those changes which the African, the Asiatic, or the American undergo, are but accidental deformities, which a kinder climate, better nourishment, or more civilized manners, would, in a course of centuries, very probably, remove.



C H A P. XI.

Of Monsters.

HITHERTO I have only spoken of those varieties in the human species, that are common to whole nations; but there are varieties of another kind, which are only found in the individual; and, being more rarely seen, are, therefore, called monstrous. If we examine into the varieties of distorted nature, there is scarce a limb of the body, or scarce a feature in the face, that has not suffered some reprobation, either from art or nature; being enlarged or diminished, lengthened or wrested, from its due proportion. Linnæus, after having given a catalogue of monsters, particularly adds, the flat heads of Canada, the long heads of the Chinese, and the slender waists of the women of Europe, who, by strait lacing, take such pains to destroy their health, through a mistaken desire to improve their beauty.* It belongs more to the physician than the naturalist to attend to these minute deformities; and, indeed, it is a melancholy contemplation to speculate upon a catalogue of calamities, inflicted

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* Linnæi Syst. vol. i. p. 29. Monorchides ut minus fertiles.

by un pitying Nature, or brought upon us by our own caprice. Some, however, are fond of such accounts; and there have been books filled with nothing else. To these, therefore, I refer the reader; who may be better pleased with accounts of men with two heads, or without any head, of children joined in the middle, of bones turned into flesh, or flesh converted into bones, than I am. * It is sufficient here to observe, that every day's experience must have shewn us miserable instances of this kind, produced by nature, or affectation; calamities that no pity can soften, nor assiduity relieve.

Passing over, therefore, every other account, I shall only mention the famous instance,

* Vide Phil. Trans. Passim. Miscellan. Curios. Johan. Baptist. Wenck. *Dissertatio Physica an ex virilis humani seminis cum brutali per nefarium coitum commixtione, aut vicissim ex bruti maris cum muliebri humano seminis commixtione possit verus homo generari.* Vide etiam Johnstons *Thaumatographia Naturalis.* Vide Adalbarthi *Disquisitio Physica ostendi duorum puerorum unus quorum dente aureo alter cum capite giganteo Biluæ spectabantur.* A man without lungs and stomach, *Journal de Scavans* 1682. p. 301. another without any brain. *Andreas Caroli Memorabilia*, p. 167, anno 1676. another without any head. *Giornale di Roma*, anno 1675. p. 26. another without any arms. *New Memoirs of Literature*, vol. 4. p. 446. In short, the variety of these accounts is almost infinite; and, perhaps, their use is as much circumscribed as their variety is extensive.

stance, quoted by Father Malbranche; upon which he founds his beautiful theory of monstrous productions. A woman of Paris, the wife of a tradesman, went to see a criminal broke alive upon the wheel, at the place of public execution. She was at that time two months advanced in her pregnancy, and no way subject to any disorders to affect the child in her womb. She was, however, of a tender habit of body; and, though led by curiosity to this horrid spectacle, very easily moved to pity and compassion. She felt, therefore, all those strong emotions which so terrible a sight must naturally inspire; shuddered at every blow the criminal received, and almost swooned at his cries. Upon returning from this scene of blood, she continued for some days pensive, and her imagination still wrought upon the spectacle she had lately seen. After some time, however, she seemed perfectly recovered from her fright, and had almost forgotten her former uneasiness. When the time of her delivery approached, she seemed no ways mindful of her former terrors, nor were her pains in labour more than usual in such circumstances. But, what was the amazement of her friends, and assistants, when the child came into the world! It

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was found that every limb in its body was broken just like those of the malefactor, and just in the same place. This poor infant, that had suffered the pains of life, even before its coming into the world, did not die, but lived in an hospital, in Paris, for twenty years after, a wretched instance of the supposed power of imagination in the mother of altering and distorting the infant in the womb. The manner in which Malbranche reasons upon this fact, is as follows. The Creator has established such a sympathy between the several parts of nature, that we are led not only to imitate each other, but also to partake in the same affections and desires. The animal spirits are thus carried to the respective parts of the body, to perform the same actions which we see others perform, to receive in some measure their wounds, and take part in their sufferings. Experience tells us, that if we look attentively on any person severely beaten, or forely wounded, the spirits immediately flow into those parts of the body which correspond to those we see in pain. The more delicate the constitution, the more it is thus affected; the spirits making a stronger impression on the fibres of a weakly habit than of a robust one. Strong vigorous men see an execution without much concern, while women of
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nicer texture are struck with horror and concern. This sensibility in them must, of consequence, be communicated to all parts of their body; and, as the fibres of the child, in the womb, are incomparably finer than those of the mother, the course of the animal spirits must, consequently, produce greater alterations. Hence, every stroke given to the criminal, forcibly struck the imagination of the woman; and, by a kind of counter-stroke, the delicate tender frame of the child.

Such is the reasoning of an ingenious man, upon a fact, the veracity of which many since have called in question.* They have allowed, indeed, that such a child might have been produced, but have denied the cause of its deformity. How could the imagination of the mother, say they, produce such dreadful effects upon her child? She has no communication with the infant; she scarce touches it in any part; quite unaffected with her concerns, it sleeps in security, in a manner secluded by a fluid, in which it swims, from her that bears it. With what a variety of deformities, say they, would all mankind be marked, if all the vain and capricious desires of the mother were thus readily written upon the body of the

* Buffon, vol. 4, p. 9.

the child? Yet, notwithstanding this plausible way of reasoning, I cannot avoid still giving some credit to the variety of instances I have either read, or seen, upon this subject. If it be a prejudice, it is as old as the days of Aristotle, and to this day as strongly believed by the generality of mankind, as ever. It does not admit of a reason; and indeed, I can give none even why the child should, in any respect, resemble the father, or the mother. The fact we generally find to be so. But why it should take the particular print of the father's features in the womb, is as hard to conceive, as why it should be affected by the mother's imagination. We all know what a strong effect the imagination has on those parts in particular, without being able to assign a cause how this effect is produced; and why the imagination may not produce the same effect in marking the child that it does in forming it, I see no reason. Those persons whose employment it is to rear up pigeons of different colours, can breed them, as their expression is, to a feather. In fact, by properly paring them, they can give what colour they will to any feather, in any part of the body. Were we to reason upon this fact, what could we say? Might it not be asserted, that the egg, being distinct from the body of the female,

cannot

cannot be influenced by it? Might it not be plausibly said, that there is no similitude between any part of the egg and any particular feather, which we expect to propagate? and yet, for all this, the fact is known to be true, and what no speculation can invalidate. In the same manner, a thousand various instances assure us, that the child, in the womb, is sometimes marked by the strong affections of the mother; how this is performed we know not; we only see the effect, without any connexion between it and the cause. The best physicians have allowed it; and have been satisfied to submit to the experience of a number of ages; but many disbelieve it, because they expect a reason for every effect. This, however, is very hard to be given, while it is very easy to appear wise by pretending incredulity.

Among the number of monsters, dwarfs and giants are usually reckoned; though not, perhaps, with the strictest propriety, since they are no way different from the rest of mankind, except in stature. It is a dispute, however, about words; and, therefore, scarce worth contending about. But there is a dispute, of a more curious nature, on this subject; namely, whether there are races of people thus very diminutive, or vastly large, or whether they be merely accidental

accidental varieties, that now and then are seen in a country, in a few persons, whose bodies some external cause has contributed to lessen, or enlarge.

With regard to men of diminutive stature, all antiquity has been unanimous in asserting their national existence. Homer was the first who has given us an account of the pigmy nation, contending with the cranes; and what poetical licence might be supposed to exaggerate, Athenæus has attempted seriously to confirm by historical assertion.* If we attend to these, we must believe that in the internal parts of Africa, there are whole nations of pigmy beings, not more than a foot in stature, who continually wage an unequal war with the birds and beasts that inhabit the plains in which they reside. Some of the ancients, however, and Strabo in particular, have supposed all these accounts to be fabulous; and have been more inclined to think this supposed nation of pigmies, nothing more than a species of apes, well known to be numerous in that part of the world. With this opinion the moderns have all concurred; and that diminutive race, which was described as human, has been long degraded into a class of animals that resemble us but very imperfectly.

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* Athenæus. ix. 390.

The existence, therefore, of a pigmy race of mankind, being founded in error, or in fable, we can expect to find men of diminutive stature only by accident, among men of the ordinary size. Of these accidental dwarfs, every country, and almost every village, can produce numerous instances. There was a time when these unfavoured children of Nature, were the peculiar favourites of the great; and no prince or nobleman, thought himself completely attended, unless he had a dwarf among the number of his domestics. These poor little men were kept to be laughed at; or to raise the barbarous pleasure of their masters, by their contrasted inferiority. Even in England, as late as the times of king James the First, the court was at one time furnished with a dwarf, a giant, and a jester: these the king often took a pleasure in opposing to each other, and often fomented quarrels among them, in order to be a concealed spectator of their animosity. It was a particular entertainment of the courtiers at that time, to see little Jeffery, for so the dwarf was called, ride round the lists, expecting his antagonist; and discovering, in his actions, all the marks of contemptible resolution.

It was in the same spirit that Peter of Russia, in the year 1710, celebrated a marriage

riage of dwarfs. This monarch, though raised by his native genius far above a barbarian, was, nevertheless, still many degrees removed from actual refinement. His pleasures, therefore, were of the vulgar kind; and this was among the number. Upon a certain day, which he had ordered to be proclaimed several months before, he invited the whole body of his courtiers, and all the foreign ambassadors, to be present at the marriage of a pigmy man and woman. The preparations for this wedding were not only very grand, but executed in a style of barbarous ridicule. He ordered, that all the dwarf men and women, within two hundred miles, should repair to the capital; and also insisted, that they should be present at the ceremony. For this purpose, he supplied them with proper vehicles; but so contrived it, that one horse was seen carrying in a dozen of them into the city at once, while the mob followed shouting, and laughing from behind. Some of them were at first unwilling to obey an order, which they knew was calculated to turn them into ridicule, and did not come; but he soon obliged them to obey; and as a punishment, enjoined, that they should wait upon the rest at dinner. The whole company of dwarfs amounted to seventy, beside the bride and bridegroom, who were richly adorned, and
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in the extremity of the fashion. For this little company in miniature, every thing was suitably provided; a low table, small plates, little glasses, and, in short, every thing was so fitted, as if all things had been dwindled to their own standard. It was his great pleasure to see their gravity and their pride; the contention of the women for places, and the men for superiority. This point he attempted to adjust, by ordering, that the most diminutive should take the lead; but this bred disputes, for none would then consent to sit foremost. All this, however, being at last settled, dancing followed the dinner, and the ball was opened with a minuet by the bridegroom, who measured exactly three feet two inches high. In the end, matters were so contrived, that this little company, who met together in gloomy pride, and unwilling to be pleased, being at last familiarized to laughter, joined in the diversion, and became, as the journalist has it, * extremely sprightly and entertaining.

But whatever may be the entertainment such guests might afford, when united, I never found a dwarf capable of affording any when alone. I have sometimes conversed with some of these that were exhibited

* Die dench würdige. Iwerg. Hockheit, &c. Lipsiæ, 1713. vol. viii. page 102 seq.

bited at our fairs, about town, and have ever found their intellects as contracted as their persons. They, in general, seemed to me to have faculties very much resembling those of children, and their desires seemed of the same kind ; being diverted with the same sports, and best pleased with such companions. Of all those I have seen, which may amount to five or six, the little man, whose name was Coan, that died lately at Chelsea, was the most intelligent and sprightly. I have heard him and the giant, who sung at the theatres, sustain a very ridiculous duet, to which they were taught to give great spirit. But this mirth, and seeming sagacity, were but assumed. He had, by long habit, been taught to look cheerful upon the approach of company ; and his conversation was but the mere etiquette of a person that had been used to receive visitors. When driven out of his walk, nothing could be more stupid or ignorant, nothing more dejected or forlorn. But, we have a compleat history of a dwarf, very accurately related by Mr. Daubenton, in his part of the *Histoire Naturel* ; which I will here take leave to translate.

This dwarf, whose name was Baby, was well known, having spent the greatest part of his life at Lunenville, in the palace of Stanislaus,

Stanislaus, the exiled king of Poland. He was born in the village of Plaisne, in France, in the year 1741. His father and mother were peasants, both of good constitutions, and inured to a life of husbandry and labour. Baby, when born, weighed but a pound and a quarter. We are not informed of the dimensions of his body at that time; but we may conjecture they were very small, as he was presented on a plate to be baptized, and for a long time lay in a slipper. His mouth, although proportioned to the rest of his body, was not, at that time, large enough to take in the nipple; and he was, therefore, obliged to be suckled by a she-goat that was in the house; and that served as a nurse, attending to his cries with a kind of maternal fondness. He began to articulate some words when eighteen months old; and at two years he was able to walk alone. He was then fitted with shoes that were about an inch and a half long. He was attacked with several acute disorders; but the small-pox was the only one which left any marks behind it. Until he was six years old, he eat no other food but pulse, potatoes, and bacon. His father and mother were, from their poverty, incapable of affording him any better nourishment; and his education was little better than

than his food, being bred up among the rustics of the place. At six years old he was about fifteen inches high ; and his whole body weighed about thirteen pounds. Notwithstanding this, he was well proportioned, and handsome ; his health was good, but his understanding scarce passed the bounds of instinct. It was at that time that the king of Poland, having heard of such a curiosity, had him conveyed to Lunenville, gave him the name of Baby, and kept him in his palace.

Baby, having thus quitted the hard condition of a peasant, to enjoy all the comforts and the conveniencies of life, seemed to receive no alteration from his new way of living, either in mind or person. He preserved the goodness of his constitution till about the age of sixteen, but his body seemed to encrease very slowly during the whole time ; and his stupidity was such, that all instructions were lost in improving his understanding. He could never be brought to have any sense of religion, nor even to shew the least signs of a reasoning faculty. They attempted to teach him dancing and music, but in vain ; he never could make any thing of music ; and as for dancing, although he beat time tolerably exact, yet he could never remember the figure, but while his dancing-master stood

master stood by to direct his motions. Notwithstanding a mind thus destitute of understanding, was not without its passions, anger and jealousy harraffed it at times; nor was he without desires of another nature.

At the age of sixteen, Baby was twenty-nine inches tall; at this he rested; but having thus arrived at his acme, the alterations of puberty, or rather, perhaps, of old age, came fast upon him. From being very beautiful, the poor little creature now became quite deformed; his strength quite forsook him; his back bone began to bend; his head hung forward; his legs grew weak; one of his shoulders turned awry; and his nose grew disproportionably large. With his strength, his natural spirits also forsook him; and, by the time he was twenty, he was grown feeble, decrepid, and marked with the strongest impressions of old age. It had been before remarked by some, that he would die of old age before he arrived at thirty; and, in fact, by the time he was twenty-two, he could scarcely walk an hundred paces, being worn with the multiplicity of his years, and bent under the burthen of protracted life. In this year he died; a cold, attended with a slight fever, threw him into a kind of lethargy, which had a few momentary intervals;

but he could scarce be brought to speak. However, it is asserted, that in the five last days of his life, he shewed a clearer understanding, than in the times of best health : but at length he died, after enduring great agonies, in the twenty-second year of his age.

Opposite to this accidental diminution of the human race, is that of its extraordinary magnitude. Concerning the reality of a nation of Giants, there have been many disputes among the learned. Some have affirmed the probability of such a race ; and others, as warmly have denied the possibility of their existence. But it is not from any speculative reasonings, upon a subject of this kind, that information is to be obtained ; it is not from the disputes of the scholar, but the labours of the enterprizing, that we are to be instructed in this enquiry. Indeed, nothing can be more absurd, than what some learned men have advanced upon this subject. It is very unlikely, says Grew, that there should either be dwarfs or giants ; or if such, they cannot be fitted for the usual enjoyment of life and reason. Had man been born a dwarf, he could scarce have been a reasonable creature ; for to that end, he must have a jolt head, and then he would not have body and blood enough to supply his brain with spirits ;

spirits : or if he had a small head, proportionable to his body, there would not be brain enough for conducting life. But it is still worse with giants ; and there could never have been a nation of such, for there would not be food enough found in any country to sustain them ; or if there were beasts sufficient for this purpose, there would not be grass enough for their maintenance. But what is still more, add others, giants could never be able to support the weight of their own bodies ; since a man of ten feet high, must be eight times as heavy as one of the ordinary stature ; whereas, he has but twice the size of muscles to support such a burthen : and, consequently, would be overloaded with the weight of his own body. Such are the theories upon this subject ; and they require no other answer, but that experience proves them both to be false : dwarfs are found capable of life and reason ; and giants are seen to carry their own bodies. We have several accounts from mariners, that a nation of giants actually exists ; and mere speculation should never induce us to doubt their veracity.

— Ferdinand Magellan was the first who discovered this race of people along the coast, towards the extremity of South America. Magellan was a Portuguese, of noble extraction, who having long behaved

with great bravery, under Albuquerk, the conqueror of India, he was treated with neglect by the court, upon his return. Applying, therefore, to the king of Spain, he was entrusted with the command of five ships, to take and subdue the Molucca islands; upon one of which he was slain. It was in his voyage thither, that he happened to winter in St. Julian's Bay, an American harbour, forty-nine degrees south of the line. In this desolate region, where nothing were seen but objects of terror, where neither trees nor verdure dressed the face of the country, they remained for some months without seeing any human creature. They had judged the country to be utterly uninhabitable; when one day, they saw approaching, as if he had been dropt from the clouds, a man of enormous stature, dancing and singing, and putting dust upon his head, as they supposed, in token of peace. This overture for friendship was, by Magellan's command, quickly answered by the rest of his men; and the giant approaching, testified every mark of astonishment and surprize. He was so tall, that the Spaniards only reached his waist; his face was broad, his colour brown, and painted over with a variety of tints; each cheek had the resemblance of an heart drawn upon it; his hair was approaching
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to whiteness; he was cloathed in skins, and armed with a bow. Being treated with kindness, and dismissed with some trifling presents, he soon returned, with many more of the same stature; two of whom the mariners decoyed on ship-board: nothing could be more gentle than they were in the beginning; they considered the fetters that were preparing for them, as ornaments, and played with them, like children with their toys; but when they found for what purpose they were intended, they instantly exerted their amazing strength, and broke them in pieces with a very easy effort. This account, with a variety of other circumstances, has been confirmed by succeeding travellers: Herrera, Sebald Wert, Oliver Van Noort, and James le Maire, all correspond in affirming the fact, although they differ in many particulars of their respective descriptions. The last voyager we have had, that has seen this enormous race, is Commodore Byron. I have talked with the person who first gave the relation of that voyage, and who was the carpenter of the Commodore's ship; he was a sensible, understanding man, and I believe extremely faithful. By him, therefore, I was assured, in the most solemn manner, of the truth of his relation; and this account has since been confirmed by one or two publications;

cations; in all which, the particulars are pretty nearly the same. One of the circumstances which most puzzled me to reconcile to probability, was that of the horses, on which they are described as riding down to the shore. We know the American horse to be of European breed; and, in some measure, to be degenerated from the original. I was at a loss, therefore, to account how an horse of not more than fourteen hands high, was capable of carrying a man of nine feet; or, in other words, an animal almost as large as itself. But the wonder will cease, when we consider, that so small a beast as an ass, will carry a man of ordinary size tolerably well; and the proportion between this, and the former instance, is tolerably exact. We can no longer, therefore, refuse our assent to the existence of this gigantic race of mankind; in what manner they are propagated, or under what regulations they live, is a subject that remains for future investigation. It should appear, however, that they are a wandering nation, changing their abode with the course of the sun, and shifting their situation, for the convenience of food, climate, or pasture.

This race of giants are described as possessed of great strength; and, no doubt, they

they must be very different from those accidental giants that are to be seen in different parts of Europe. Stature with these, seems rather their infirmity than their pride; and adds to their burthen, without encreasing their strength. Of those I have seen, the generality were ill-formed and unhealthful; weak in their persons, or incapable of exerting what strength they were possessed of. The same defects of understanding that attended those of suppressed stature, were found in those who were thus overgrown: they were heavy, phlegmatic, stupid, and inclined to sadness. Their numbers, however, are but few; and it is thus kindly ordered by Providence, that as the middle state is the best fitted for happiness; so the middle ranks of mankind are produced in the greatest variety.

However, mankind seems naturally to have a respect for men of extraordinary stature; and it has been a supposition of long standing, that our ancestors were much taller, as well as much more beautiful than we. This has been, indeed, a theme of poetical declamation from the beginning; and man was scarce formed, when he began to deplore an imaginary decay. Nothing is more natural than this progress of the mind, in looking up to antiquity with reverential wonder. Having been accustomed to com-
pare

pare the wisdom of our fathers, with our own in early imbecility, the impression of their superiority remains when they no longer exist, and when we cease to be inferior. Thus the men of every age consider the past as wiser than the present; and the reverence seems to accumulate as our imaginations ascend. For this reason, we allow remote antiquity many advantages, without disputing their title: the inhabitants of uncivilized countries represent them as taller and stronger; and the people of a more polished nation, as more healthy and more wise. Nevertheless, these attributes seem to be only the prejudices of ingenious minds; a kind of gratitude, which we hope in turn to receive from posterity. The ordinary stature of men, Mr. Derham observes, is, in all probability, the same now as at the beginning. The oldest measure we have of the human figure, is in the monument of Cheops, in the first pyramid of Egypt. This must have subsisted many hundred years before the times of Homer, who is the first that deploras the decay. This monument, however, scarce exceeds the measure of our ordinary coffins: the cavity is no more than six feet long, two feet wide, and deep in about the same proportion. Several mummies also, of a very early age, are found to be only of the ordinary

dinary stature ; and shew that, for these three thousand years at least, men have not suffered the least diminution. We have many corroborating proofs of this, in the ancient pieces of armour which are dug up in different parts of Europe. The brass helmet dug up at Medauro, fits one of our men, and yet is allowed to have been left there at the overthrow of Asdrubal. Some of our finest antique statues, which we learn from Pliny, and others, to be exactly as big as the life, still continue to this day, remaining monuments of the superior excellence of their workmen indeed, but not of the superiority of their stature. We may conclude, therefore, that men have been, in all ages, pretty much of the same size they are at present ; and that the only difference must have been accidental, or perhaps national.

As to the superior beauty of our ancestors, it is not easy to make the comparison; beauty seems a very uncertain charm; and frequently is less in the object, than in the eye of the beholder. Were a modern lady's face formed exactly like the Venus of Medicis, or the sleeping vestal, she would scarce be considered beautiful, except by the lovers of antiquity, whom, of all her admirers, perhaps, she would be least desirous of pleasing. It is true, that we have some disorders

disorders among us that disfigure the features, and from which the ancients were exempt ; but it is equally so, that we want some which were common among them, and which were equally deforming. As for their intellectual powers, these also were probably the same as ours : we excel them in the sciences, which may be considered as an history of accumulated experience ; and they excel us in the poetic arts, as they had the first rifling of all the striking images of Nature.



C H A P. XII.

Of Mummies, Wax-Works, &c.

“**M**A N is * not content with the usual term of life, but he is willing to lengthen out his existence by art; and although he cannot prevent death, he tries to obviate his dissolution. It is natural to attempt to preserve even the most trifling relics of what has long given us pleasure; nor does the mind separate from the body, without a wish, that even the wretched heap of dust it leaves behind, may yet be remembered. The embalming, practised in various nations, probably had its rise in this fond desire: an urn filled with ashes, among the Romans, served as a pledge of continuing affection; and even the grassy graves in our own church-yards, are raised above the surface, with the desire that the body below should not be wholly forgotten. The soul, ardent after eternity for itself, is willing to procure, even for the body, a prolonged duration.”

But of all nations, the Egyptians carried this art to the highest perfection: as it was
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* This chapter I have, in a great measure, translated from Mr. Daubenton. Whatever is added from others, is marked with inverted commas.

a principle of their religion, to suppose the soul continued only coeval to the duration of the body, they tried every art to extend the life of the one, by preventing the dissolution of the other. In this practice they were exercised from the earliest ages; and the mummies they have embalmed in this manner, continue in great numbers to the present day. We are told, in Genesis, that Joseph seeing his father expire, gave orders to his physicians to embalm the body, which they executed in the compass of forty days, which was the usual time of embalming. Herodotus also, the most ancient of the prophane historians, gives us a copious detail of this art, as it was practised, in his time, among the Egyptians. There are certain men among them, says he, who practise embalming as a trade; which they perform with all expedition possible. In the first place, they draw out the brain through the nostrils, with irons adapted to this purpose; and in proportion as they evacuate it in this manner, they fill up the cavity with aromatics: they next cut open the belly, near the sides, with a sharpened stone, and take out the entrails, which they cleanse, and wash in palm oil: having performed this operation, they roll them in aromatic powder, fill them with myrrh, cassia, and other perfumes, except incense; and re-
place

place them, sewing up the body again. After these precautions, they salt the body with nitre, and keep it in the salting-place for seventy days, it not being permitted to preserve it so any longer. When the seventy days are accomplished, and the body washed once more, they swathe it in bands made of linen, which have been dipt in a gum the Egyptians use instead of salt. When the friends have taken the body, they make an hollow trough, something like the shape of a man, in which they place the body ; and this they inclose in a box, preserving the whole as a most precious relick, placed against the wall. Such are the ceremonies used with regard to the rich ; as for those who are contented with an humbler preparation, they treat them as follows : they fill a syringe with an odoriferous liquor extracted from the cedar tree, and, without making any incision, inject it up the body of the deceased, and then keep it in nitre, as long as in the former case. When the time is expired, they evacuate the body of the cedar liquor which had been injected ; and such is the effect of this operation, that the liquor dissolves the intestines, and brings them away : the nitre also, serves to eat away the flesh ; and leaves only the skin and the bones remaining. This
done,

done, the body is returned to the friends, and the embalmer takes no farther trouble about it. The third method of embalming those of the meanest condition, is merely by purging and cleansing the intestines by frequent injections, and preserving the body for a similar term in nitre, at the end of which it is restored to the relations.

Diodorus Siculus also, makes mention of the manner in which these embalmings are performed. According to him, there were several officers appointed for this purpose: the first of them, who was called the scribe, marked those parts of the body, on the left side, which were to be opened; the cutter made the incision; and one of those that were to salt it, drew out all the bowels, except the heart and the kidneys; another washed them in palm-wine, and odoriferous liquors; afterwards, they anointed for above thirty days, with cedar, gum, myrrh, cinnamon, and other perfumes. These aromatics preserved the body entire for a long time, and gave it a very agreeable odour. It was not in the least disfigured by this preparation; after which it was returned to the relations, who kept it in a coffin, placed upright against the wall.

Most of the modern writers who have treated on this subject, have merely repeated
what

what has been said by Herodotus; and if they add any thing of their own, it is but merely from conjecture. Dumont observes, that it is very probable, that aloes, bitumen, and cinnamon, make a principal part of the composition which is used on this occasion: he adds, that after embalming, the body is put into a coffin, made of the sycamore-tree, which is almost incorruptible. Mr. Grew remarks, that in an Egyptian mummy, in the possession of the Royal Society, the preparation was so penetrating, as to enter into the very substance of the bones, and rendered them so black, that they seemed to have been burnt. From this he is induced to believe, that the Egyptians had a custom of embalming their dead, by boiling them in a kind of liquid preparation, until all the aqueous parts of the body were exhaled away; and until the oily or gummy matter had penetrated throughout. He proposes, in consequence of this, a method of macerating, and afterwards of boiling the dead body in oil of walnut.

I am, for my own part, of opinion, that there were several ways of preserving dead bodies from putrefaction; and that this would be no difficult matter, since different nations have all succeeded in the attempt.

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We have an example of this kind among the Guanches, the ancient inhabitants of the island of Teneriff. Those who survived the general destruction of this people, by the Spaniards, when they conquered this island, informed them, that the art of embalming was still preserved there; and that there was a tribe of priests among them, possessed of the secret, which they kept concealed as a sacred mystery. As the greatest part of the nation was destroyed, the Spaniards could not arrive at a complete knowledge of this art; they only found out a few of the particulars. Having taken out the bowels, they washed the body several times in a lee, made of the dried bark of the pine-tree, warmed, during the summer, by the sun, or by a stove in the winter. They afterwards anointed it with butter, or the fat of bears, which they had previously boiled with odoriferous herbs, such as sage and lavender. After this unction, they suffered the body to dry; and then repeated the operation, as often as it was necessary, until the whole substance was impregnated with the preparation. When it was become very light, it was then a certain sign that it was fit, and properly prepared. They then rolled it up in the dried skins of goats; which, when they had a
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mind to save expence, they suffered to remain with the hair still growing upon them. Purchas assures us, that he has seen mummies of this kind in London; and mentions the name of a gentleman who had seen several of them in the island of Teneriff, which were supposed to have been two thousand years old; but without any certain proofs of such great antiquity. This people, who probably came first from the coasts of Africa, might have learned this art from the Egyptians, as there was a traffic carried on from thence into the most internal parts of Africa.

Father Acofta, and Garcilaffo de la Vega, make no doubt but that the Peruvians understood the art of preserving their dead for a very long space of time. They assert their having seen the bodies of several Incas, that were perfectly preserved. They still preserved their hair, and their eyebrows; but they had eyes, made of gold, put in the places of those taken out. They were cloathed in their usual habits, and seated in the manner of the Indians, their arms placed on their breasts. Garcilaffo touched one of their fingers, and found it apparently as hard as wood; and the whole body was not heavy enough to over-burthen a weak man, who should attempt to carry it away. Acofta presumes, that these

bodies were embalmed with a bitumen, of which the Indians knew the properties. Garcilasso, however, is of a different opinion, as he saw nothing bituminous about them; but he confesses, that he did not examine them very particularly; and he regrets his not having enquired into the methods used for that purpose. He adds that, being a Peruvian, his countrymen would not have scrupled to inform him of the secret, if they really had it still among them.

Garcilasso, thus being ignorant of the secret, makes use of some inductions, to throw light upon the subject; he asserts, that the air is so dry and so cold at Cusco, that flesh dries there like wood, without corrupting: and he is of opinion, that they dried the body in snow, before they applied the bitumen: he adds, that in the times of the Incas, they usually dried the flesh which was designed for the ammunition of the army; and that when they had lost their humidity, they might be kept without salt, or any other preparation.

It is said, that at Spitzbergen, which lies within the arctic circle, and, consequently, in the coldest climate, bodies never corrupt, nor suffer any apparent alteration, even though buried for thirty years: nothing corrupts or putrifies in that climate; the

the wood which has been employed in building those houses where the train-oil is separated, appears as fresh as on the day they were first cut.

If excessive cold, therefore, be thus capable of preserving bodies from corruption, it is not less certain, that a great degree of dryness, produced by heat, produces the same effect. It is well known, that the men and animals that are buried in the sands of Arabia, quickly dry up, and continue in preservation for several ages, as if they had been actually embalmed. It has often happened, that whole caravans have perished in crossing those deserts, either by the burning winds that infest them, or by the sands which are raised by the tempest, and overwhelm every creature in certain ruin. The bodies of those persons are preserved entire; and they are often found in this condition by some accidental passenger. Many authors, both ancient and modern, make mention of such mummies as these; and Shaw says, that he has been assured, that numbers of men, as well as other animals, have been thus preserved, for times immemorial, in the burning sands of Saibah, which is a place, he supposes, situate between Rasem and Egypt.

The corruption of dead bodies, being entirely caused by the fermentation of the

humours, whatever is capable of hindering or retarding this fermentation, will contribute to their preservation. Both heat and cold, though so contrary in themselves, produce similar effects in this particular, by drying up the humours. The cold in condensing and thickening them, and the heat in evaporating them before they have time to act upon the solids. But it is necessary that these extremes should be constant; for if they succeed each other so as that cold shall follow heat, or dryness humidity, it must then necessarily happen, that corruption must ensue. However, in temperate climates, there are natural causes capable of preserving dead bodies; among which we may reckon the qualities of the earth in which they are buried. If the earth be drying and astringent, it will imbibe the humidity of the body; and it may be probably for this reason that the bodies buried in the monastery of the Cordeliers, at Thoulouse, do not putrify, but dry in such a manner that one may lift them up by one arm.

The gums, resins, and bitumens, with which dead bodies are embalmed, keep off the impressions which they would else receive from the alteration of the temperature of the air; and still more,

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if a body thus prepared be placed in a dry or burning sand, the most powerful means will be united for its preservation. We are not to be surprized, therefore, at what we are told by Chardin, of the county of Chorosan, in Persia. The bodies which have been previously embalmed, and buried in the sands of that country, as he assures us, are found to petrify, or, in other words, to become extremely hard, and are preserved for several ages. It is asserted that some of them have continued for a thousand years.

The Egyptians, as has been mentioned above, swathed the body with linen bands, and enclosed it in a coffin; however, it is probable that, with all these precautions, they would not have continued till now, if the tombs, or pits, in which they were placed, had not been dug in a dry chalky soil, which was not susceptible of humidity; and which was, besides, covered over with a dry sand of several feet thickness.

The sepulchres of the ancient Egyptians subsist to this day. Most travellers who have been in Egypt, have described those of ancient mummies, and have seen the mummies interred there. These catacombs are within two leagues of the ruins of this city, nine leagues from Grand Cairo,

Cairo, and about two miles from the village of Zaccara. They extend from thence to the Pyramids of Pharaoh, which are about eight miles distant. These sepulchres lie in a field, covered with a fine running sand, of a yellowish colour. The country is dry and hilly; the entrance of the tomb is choaked up with sand; there are many open, but several more that are still concealed. The inhabitants of the neighbouring village have no other commerce, or method of subsisting, but by seeking out mummies, and selling them to such strangers as happen to be at Grand Cairo. "This commerce, some years ago, was not only a very common, but a very gainful one. A complete mummy was often sold for twenty pounds: but it must not be supposed that it was bought at such an high price from a mere passion for antiquity; there were much more powerful motives for this traffic. Mummy at that time made a considerable article in medicine; and a thousand imaginary virtues were ascribed to it, for the cure of most disorders, particularly of the paralytic kind. There was no shop, therefore, without mummy in it; and no physician thought he had properly treated his patient, without adding this to his prescription. Induced by the general repute, in which this supposed

posed drug was at that time, several Jews, both of Italy and France, found out the art of imitating mummy so exactly, that they, for a long time, deceived all Europe. This they did by drying dead bodies in ovens, after having prepared them with myrrh, aloes, and bitumen. Still, however, the request for mummies continued, and a variety of cures were daily ascribed to them. At length Paræus wrote a treatise on their total inefficacy in physic ; and shewed their abuse in loading the stomach, to the exclusion of more efficacious medicines. From that time, therefore, their reputation began to decline ; the Jews discontinued their counterfeits, and the trade returned entire to the Egyptians, when it was of no longer value. The industry of seeking after mummies is now totally relaxed, their price merely arbitrary, and just what the curious are willing to give."

In seeking for mummies, they first clear away the sand, which they may do for weeks together, without finding what they want. Upon coming to a little square opening, of about eighteen feet in depth, they descend into it, by holes for the feet, placed at proper intervals ; and there they are sure of finding what they seek for. These caves, or wells, as they call them there, are hollow-
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ed out of a white free-stone, which is found in all this country, a few feet below the covering of sand. When one gets to the bottom of these, which are sometimes forty-feet below the surface, there are several square openings, on each side, into passages of ten or fifteen feet wide, and these lead to chambers of fifteen or twenty feet square. These are all hewn out into the rock; and in each of the catacombs are to be found several of these apartments, communicating with each other. They extend a great way under ground, so as to be under the city of Memphis, and in a manner to undermine its environs.

In some of the chambers, the walls are adorned with figures and hieroglyphics; in others, the mummies are found in tombs, round the apartment hollowed out in the rock. These tombs are upright, and cut into the shape of a man, with his arms stretched out. There are still others found, and these in the greatest number, in wooden coffins, or in cloths covered with bitumen. These coffins, or wrappers, are all over covered with a variety of ornaments. There are some of them painted, and are adorned with figures, such as that of death, and the leaden seals, on which several characters are engraven. Some of these coffins are carved
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into the human shape ; but the head alone is distinguishable ; the rest of the body is all of a piece, and terminated by a pedestal, while there are some with their arms hanging down ; and it is by these marks that the bodies of persons of rank are distinguished from those of the meaner order. These are generally found lying on the floor, without any profusion of ornaments ; and in some chambers the mummies are found indiscriminately piled upon each other, and buried in the sand.

Many mummies are found lying on their backs ; their heads turned to the north, and the hands placed on the belly. The bands of linen, with which these are swathed, are found to be more than a thousand yards long ; and, of consequence, the number of circumvolutions they make about the body must have been amazing. These were performed by beginning at the head, and ending at the feet ; but they contrived it so as to avoid covering the face. However, when the face is entirely uncovered, it moulders into dust immediately upon the admission of the air. When, therefore, it is preserved entire, a slight covering of cloth is so disposed over it, as that the shape of the eye, the nose, and the mouth, are seen under it. Some mummies have been found with a
long

long beard, and hair that reached down to the mid-leg, nails of a surprizing length, and some gilt, or at least painted of a gold colour. Some are found with bands upon the breast, covered with hieroglyphics, in gold, silver, or in green; and some with tutelary idols, and other figures of jasper, within their body. A piece of gold, also, has often been found under their tongues, of about two pistoles value; and, for this reason, the Arabians spoil all the mummies they meet with, in order to get at the gold.

But, although art, or accident, has thus been found to preserve dead bodies entire, it must by no means be supposed that it is capable of preserving the exact form and lineaments of the deceased person. Those bodies which are found dried away in the Desarts, or in some particular church-yards, are totally deformed, and scarce any lineaments remain of their external structure. Nor are the mummies preserved by embalming, in a better condition. The flesh is dried away, hardened, and hidden under a variety of bandages; the bowels, as we have seen, are totally removed; and from hence, in the most perfect of them, we see only a shapeless mass of skin discoloured; and even the features scarce distinguishable. The art is, therefore, an effort rather of preserving
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the substance than the likeness of the deceased ; and has, consequently, not been brought to its highest pitch of perfection. It appears from a mummy, not long since dug up in France, that the art of embalming was more completely understood in the western world than even in Egypt itself. This mummy, which was dug up at Auvergne, was an amazing instance of their skill, and is one of the most curious reliques in the art of preservation. As some peasants, in that part of the world, were digging in a field near Rion, within about twenty-six paces of the highway, between that and the river Artier, they discovered a tomb, that was about a foot and a half beneath the surface. It was composed only of two stones ; one of which formed the body of the sepulchre, and the other the cover. This tomb was of freestone ; seven feet and a half long, three feet and a half broad, and about three feet high. It was of rude workmanship ; the cover had been polished, but was without figure or inscription ; within this tomb was placed a leaden coffin, four feet seven inches long, fourteen inches broad, and fifteen high. It was not made coffin fashion, but oblong, like a box, equally broad at both ends, and covered with a lid that fitted on like a snuff-box, without an hinge. This cover had two holes in it, each

each of about two inches long, and very narrow, filled with a substance resembling butter; but for what purpose intended remains unknown. Within this coffin was a mummy, in the highest and most perfect preservation. The internal sides of the coffin were filled with an aromatic substance, mingled with clay. Round the mummy was wrapped a coarse cloth, in form of a napkin; under this were two shirts, or shrouds, of the most exquisite texture; beneath these a bandage, which covered all parts of the body, like an infant in swaddling cloaths; still, under this general bandage there was another, which went particularly round the extremities, the hands and the legs. The head was covered with two caps; the feet and hands were without any particular bandages; and the whole body was covered with an aromatic substance, an inch thick. When these were removed, and the body exposed naked to view, nothing could be more astonishing than the preservation of the whole, and the exact resemblance it bore to a body that had but just been dead a day or two before. It appeared well proportioned, except that the head was rather large, and the feet small. The skin had all the pliancy and colour of a body lately dead; the visage, however, was of a brownish hue. The belly yielded to the touch; all the joints were flexible, except

except those of the legs and feet; the fingers stretched forth of themselves when bent inwards. The nails still continued perfect; and all the marks of the joints, both in the fingers, the palms of the hands, and the soles of the feet, remained perfectly visible. The bones of the arms and legs were soft and pliant; but, on the contrary, those of the skull preserved their rigidity; the hair, which only covered the back of the head, was of a chefnut colour, and about two inches long. The pericranium at top was separated from the skull, by an incision, in order to open that for the introducing proper aromatics in the place of the brain, where they were found mixed with clay. The teeth, the tongue, and the ears, were all preserved in perfect form. The intestines were not taken out of the body, but remained pliant and entire, as in a fresh subject; and the breast was made to rise and fall like a pair of bellows. The embalming preparation had a very strong and pungent smell, which the body preserved for more than a month after it was exposed to the air. This odour was perceived wherever the mummy was laid; although it remained there but a very short time, it was even pretended that the peasants of the neighbouring villages were incommoded by it. If one touched either the mummy, or any part of the preparation, the
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hands smelt of it for several hours after, although washed with water, spirit of wine, or vinegar. This mummy, having remained exposed for some months to the curiosity of the public, began to suffer some mutilations. A part of the skin of the forehead was cut off; all its teeth were drawn out, and some attempts were made to pull away the tongue. It was, therefore, put into a glass-case, and shortly after transmitted to the king of France's cabinet, at Paris.

There are many reasons to believe this to be the body of a person of the highest distinction; however, no marks remain to assure us either of the quality of the person, or the time of his decease. There only are to be seen some irregular figures on the coffin; one of which represents a kind of star. There were also some singular characters upon the bandages, which were totally defaced by those who had torn them away. However, it should seem that it had remained for several ages in this state, since the first years immediately succeeding the interment, are usually those, in which the body is most liable to decay. It appears also to be a much more perfect method of embalming than that of the Egyptians; as in this the flesh continues with its natural elasticity and colour, the bowels remain entire, and the joints have almost the pliancy which they had when the person was alive.

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Upon the whole, it is probable that a much less tedious preparation than that used by the Egyptians would have sufficed to keep the body from putrefaction ; and that an injection of petreoleum inwardly, and a layer of asphaltum without, would have sufficed to have made a mummy ; and it is remarkable that Auvergne, where this was found, affords these two substances in sufficient plenty. This art, therefore, might be brought to greater perfection than it has arrived at hitherto, were the art worth preserving. But mankind have long since grown wiser in this respect ; and are contented no longer to keep by them a deformed carcass, which, instead of aiding their magnificence, must only serve to mortify their pride.



C H A P. XIII.

Of Animals.

LEAVING man, we now descend to the lower ranks of animated nature, and prepare to examine the life, manners, and characters of these our humble partners in the creation. But, in such a wonderful variety as is diffused around us, where shall we begin? The number of beings endued with life as well as we, seems, at first view, infinite. Not only the forest, the waters, the air, teems with animals of various kinds; but almost every vegetable, every leaf, has millions of minute inhabitants, each of which fill up the circle of its allotted life, and some of which are found objects of the greatest curiosity. In this seeming exuberance of animals, it is natural enough for ignorance to lie down in hopeless uncertainty, and to declare what requires labour to particularize to be utterly inscrutable. It is otherwise however with the active and searching mind; no way intimidated with the immense variety, it begins the task of numbering, grouping and classing all the various kinds that fall within its notice; finds every day new relations
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the several parts of the creation, acquires the art of considering several at a time under one point of view; and, at last, begins to find that the variety is neither so great nor so inscrutable as was at first imagined. As in a clear night, the number of the stars seems infinite; yet, if we sedulously attend to each in its place, and regularly class them, they will soon be found to diminish, and come within a very scanty computation.

Method, therefore, is one of the principal helps in natural history, and without it very little progress can be made in this science. It is by that alone we can hope to dissipate that glare, if I may so express it, that arises from a multiplicity of objects at once presenting themselves to the view. It is method that fixes the attention to one point, and leads it, by slow and certain degrees, to leave no part of nature unobserved.

All naturalists, therefore, have been very careful in adopting some method of classing or grouping the several parts of nature; and some have written books of natural history with no other view. These methodical divisions some have treated with contempt *, not considering that books, in general, are

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* Mr. Buffon in his Introduction, &c.

written with opposite views: some to be read, and some only to be occasionally consulted. The methodists, in natural history, seem to be content with the latter advantage; and have sacrificed to order alone, all the delights of the subject, all the arts of heightening, awakening, or continuing curiosity. But they certainly have the same use in science that a dictionary has in language; but with this difference, that in a dictionary we proceed from the name to the definition; in a system of natural history, we proceed from the definition to find out the thing. Without the aid of system, nature must still have lain undistinguished, like furniture in a lumber-room; every thing we wish for is there, indeed; but we know not where to find it. If, for instance, in a morning excursion, I find a plant, or an insect, the name of which I desire to learn; or, perhaps, am curious to know whether already known; in this enquiry I can expect information only from one of these systems, which, being couched in a methodical form, quickly directs me to what I seek for. Thus we will suppose that our enquirer has met with a spider, and that he has never seen such an insect before. He is taught by the writer of a system * to examine whether it has wings, and he finds that

* Linnaeus.

that it has none. He, therefore, is to look for it among the wingless insects, or the Aptera, as he calls them; he then is to see whether the head and breast make one part of the body, or are disunited: he finds they make one: he is then to reckon the number of feet and eyes, and he finds that it has eight of each. The insect, therefore, must be either a scorpion or a spider; but he lastly examines its feelers, which he finds clavated, or clubbed; and, by all these marks, he at last discovers it to be a spider. Of spiders, there are forty-seven sorts; and, by reading the description of each, the enquirer will learn the name of that which he desires to know. With the name of the insect, he is also directed to those authors that have given any account of it, and the page where that account is to be found; by this means he may know at once what has been said of that animal by others, and what there is of novelty in the result of his own researches.

From hence, therefore, it will appear, how useful those systems in natural history are to the enquirer; but, having given them all their merit, it would be wrong not to observe, that they have in general been very much abused. Their authors, in general, seem to think that they are im-

provers of natural history, when in reality they are but guides; they seem to boast that they are adding to our knowledge, while they are only arranging it. These authors also, seem to think that the reading of their works and systems, is the best method to attain a knowledge of nature; but, setting aside the impossibility of getting through the whole volumes of a dry long catalogue, the multiplicity of whose contents is too great for even the strongest memory; such works rather tell us the names than the history of the creature we desire to enquire after. In these dreary pages, every insect, or plant, that has a name, makes as distinguished a figure as the most wonderful, or the most useful. The true end of studying nature is to make a just selection, to find those parts of it that most conduce to our pleasure or convenience, and to leave the rest in greater neglect. But these systems, employing the same degree of attention upon all, give us no opportunities of knowing which most deserves attention; and he who has gained his knowledge from such systems only, has his memory crouded with a number of trifling, or minute particulars, which, it should be his business and his labour to forget. These books, as was said before, are useful to be consulted, but they are
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very unnecessary to be read; no enquirer in nature should be without one of them; and without any doubt Linnæus deserves the preference.

One fault more, in almost all these systematic writers, and that which leads me to the subject of the present chapter, is, that seeing the necessity of methodical distribution in some parts of nature, they have introduced it into all. Finding the utility of arranging plants, birds, or insects, they have arranged quadrupedes also with the same assiduity; and although the number of these is so few as not to reach two hundred, they have darkened the subject with distinctions and divisions, which only serve to puzzle and perplex. All method is only useful in giving perspicuity, where the subject is either dark or copious: but with regard to quadrupedes, the number is but few; many of them we are well acquainted with by habit; and the rest may very readily be known, without any method. In treating of such, therefore, it would be useless to confound the reader with a multiplicity of divisions; as quadrupedes are conspicuous enough to obtain the second rank in nature, it becomes us to be acquainted with, at least, the names of them all. However, as there are naturalists who have gained a name from the excel-

lence of their methods, in classing these animals, some readers may desire to have a knowledge of what has been laboriously invented for their instruction. I will just take leave, therefore, to mention the most applauded methods of classing animals, as adopted by Ray, Klein, and Linnæus; for it often happens, that the terms which have been long used in a science, though frivolous, become, by prescription, a part of the science itself.

Ray, after Aristotle, divides all animals into two kinds; those which have blood, and those which are bloodless. In the last class, he places all the insect tribes. The former he divides into such as breathe through the lungs, and such as breathe through gills: these last comprehend the fishes. In those which breathe through the lungs, some have the heart composed of two ventricles, and some have it of one. Of the last are all animals of the cetaceous kind, all oviparous quadrupedes, and serpents. Of those that have two ventricles, some are oviparous, which are the birds; and some viviparous, which are quadrupedes. The quadrupedes he divides into such as have an hoof, and such as are claw-footed. Those with the hoof, he divides into such as have it undivided, such as have it cloven, and such as have the hoof divided
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into more parts, as the rhinoceros, and hippopotamos. Animals with the cloven hoof, he divides into such as chew the cud, such as the cow, and the sheep; and such as are not ruminant, as the hog. He divides those animals that chew the cud, into four kinds: the first have hollow horns, which they never shed, as the cow; the second is of a less species, and is of the sheep kind; the third is of the goat kind; and the last, which have solid horns, and shed them annually, are of the deer kind. Coming to the claw-footed animals, he finds some with large claws, resembling the fingers of the human hand; and these he makes the ape kind. Of the others, some have the foot divided in two, and have a claw to each division; these are the camel kind. The elephant makes a kind by itself, as its claws are covered over by a skin. The rest of the numerous tribe of claw-footed animals, he divides into two kinds; the analogous, or such as resemble each other; and the anomalous, which differ from the rest. The analogous claw-footed animals, are of two kinds: they have more than two cutting teeth in each jaw, such as the lion and the dog, which are carnivorous; or they have but two cutting teeth in each jaw; and these are chiefly fed upon vegetables.

vegetables. The carnivorous kinds are divided into the great and the little. The great carnivorous animals are divided into such as have a short snout, as the cat and the lion; and such as have it long and pointed, as the dog and the wolf. The little claw-footed carnivorous animals, differ from the great, in having a proportionably smaller head, and a slender body, that fits them for creeping into holes, in pursuit of their prey, like worms; and they are therefore called the vermin kind.

We see, from this sketch of division and subdivision, how a subject, extremely delightful and amusing in itself, may be darkened, and rendered disgusting. But, notwithstanding, Ray seems to be one of the most simple distributors; and his method is still, and not without reason, adopted by many. Such as have been at the trouble to learn this method, will certainly find it useful; nor would we be thought, in the least, to take from its merits; all we contend for is, that the same information may be obtained by a pleasanter and an easier method.

It was the great success of Ray's method, that soon after produced such a variety of attempts in the same manner; but almost all less simple, and more obscure. Mr. Klein's method is briefly as follows; he makes the power
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of changing place, the characteristic mark of animals in general; and he takes their distinctions from their aptitude and fitness for such a change. Some change place by means of feet, or some similar contrivance; others have wings and feet: some can change place only in water, and have only fins; some go upon earth, without any feet at all: some change place, by moving their shell; and some move only at a certain time of the year. Of such, however, as do not move at all, he takes no notice. The quadrupedes that move chiefly by means of four feet upon land, he divides into two orders. The first are the hoofed kind; and the second, the claw kind. Each of these orders is divided into four families. The first family of the hoofed kind, are the single hoofed, such as the horse, ass, &c. The second family are such as have the hoof cloven into two parts, such as the cow, &c. The third family have the hoof divided into three parts; and in this family is found only the rhinoceros. The fourth family have the hoof divided into five parts; and in this is only to be found the elephant. With respect to the clawed kind, the first family comprehends those that have but two claws on each foot, as the camel; the second family have three claws; the third, four; and the fourth, five.

five. This method of taking the distinctions of animals from the organs of motion, is ingenious ; but it is, at the same time, incomplete : and, besides, the divisions into which it must necessarily fall, is inadequate ; since, for instance, in his family with two claws, there is but one animal ; whereas, in his family with five claws, there are above an hundred.

Briffon, who has laboured this subject with great accuracy, divides animated nature into nine classes : namely, quadrupedes ; cetaceous animals, or those of the whale kind ; birds ; reptiles, or those of the serpent kind ; cartilaginous fishes ; spinous fishes ; shelled animals ; insects ; and worms. He divides the quadrupedes into eighteen orders ; and takes their distinctions, from the number and form of their teeth.

But of all those whose systems have been adopted and admired, Linnæus is the foremost ; as, with a studied brevity, his system comprehends the greatest variety, in the smallest space.

According to him, the first distinction of animals is to be taken from their internal structure. Some have the heart with two ventricles, and hot red blood : namely, quadrupedes and birds. The quadrupedes are viviparous, and the birds oviparous.

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Some have the heart with but one ventricle, and cold red blood ; namely amphibia and fishes. The amphibia are furnished with lungs ; the fishes, with gills.

Some have the heart with one ventricle, and cold white serum ; namely, insects and worms : the insects have feelers ; and the worms holders.

The distinctions of quadrupedes, or animals with paps, as he calls them, are taken from their teeth. He divides them into seven orders ; to which he gives names that are not easy of translation : Primates, or principals, with four cutting teeth in each jaw ; Bruta, or brutes, with no cutting teeth ; Feræ, or wild beasts, with generally six cutting teeth in each jaw ; Glires, or dormice, with two cutting teeth, both above and below ; Pecora, or cattle, with many cutting teeth above, and none below ; Belluæ, or beasts, with the fore teeth blunt ; Cete, or those of the whale kind, with cartilaginous teeth. I have but just sketched out this system, as being, in its own nature, the closest abridgment ; it would take volumes to dilate it to its proper length. The names of the different animals, and their classes, alone make two thick octavo volumes ; and yet nothing is given but the slightest description of each. I
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have omitted all criticism also, upon the accuracy of the preceding systems: this has been done both by Buffon and Daubenton, not with less truth than humour, for they had too much good sense not to see the absurdity of multiplying the terms of science to no end, and disappointing our curiosity rather with a catalogue of nature's varieties than an history of nature.

Instead, therefore, of taxing the memory and teizing the patience with such a variety of divisions and subdivisions, I will take leave to class the productions of nature in the most obvious, though not the most accurate manner. In natural history, of all other sciences, there is the least danger of obscurity. In morals, or in metaphysics, every definition must be precise, because those sciences are built upon definitions; but it is otherwise in those subjects where the exhibition of the object itself is always capable of correcting the error. Thus it may often happen that in a lax system of natural history, a creature may be ranked among quadrupedes that belongs more properly to the fish or the insect classes. But that can produce very little confusion, and every reader can thus make a system the most agreeable to his own imagination. It will be of no manner of consequence whether we call a bird
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or an insect a quadrupede, if we are careful in marking all its distinctions : the uncertainty in reasoning, or thinking, that these approximations of the different kinds of animals produce, is but very small, and happens but very rarely ; whereas the labour that naturalists have been at to keep the kinds asunder, has been excessive. This, in general, has given birth to that variety of systems which we have just mentioned, each of which seems to be almost as good as the preceding.

Taking, therefore, this latitude, and using method only where it contributes to conciseness or perspicuity, we shall divide animated nature into four classes ; namely, quadrupedes, birds, fishes, and insects. All these seem in general pretty well distinguished from each other by nature ; yet there are several instances in which we can scarce tell whether it is a bird or a quadrupede that we are about to examine ; whether it is a fish or an insect that offers to our curiosity. Nature is varied by imperceptible gradations, so that no line can be drawn between any two classes of its productions, and no definition made to comprehend them all. However, the distinctions between these classes are sufficiently marked in general ; and their encroachments upon each other are

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so rare, that it will be sufficient particularly to apprize the reader when they happen to be blended.

There are many quadrupedes that we are well acquainted with; and of those we do not know we shall form the most clear and distinct conceptions, by being told wherein they differ, and wherein they resemble those with which we are familiar. Each class of quadrupedes may be ranged under some one of the domestic kinds, that may serve for the model by which we are to form some kind of idea of the rest. Thus we may say that a tiger is of the cat kind, a wolf of the dog kind, because there are some rude resemblances between each; and a person who has never seen the wild animals will have some incomplete knowledge of their figure from the tame ones. On the contrary, I will not, as some systematic writers have done *, say that a bat is of the human kind, or an hog of the horse kind, merely because there is some resemblance in their teeth, or their paps. For, although this resemblance may be striking enough, yet a person who has never seen a bat or a hog, will never form any just conception of either, by being told of this minute similitude. In short, the method in classing quadrupedes should be taken from their most

* Linnæi Syft.

most striking resemblances; and where these resemblances do not offer, we should not force the similitude, but leave the animal to be described as a solitary species, by itself. The number of quadrupedes is so few that, indeed, without any method whatsoever, there is no great danger of confusion.

All quadrupedes, the number of which, according to Buffon, amounts to but two hundred, may be classed in the following manner.

First, those of the Horse kind. This class contains the Horse, the Ass, and the Zebra. Of these, none have horns; and their hoof is of one solid piece.

The second class are those of the Cow kind; comprehending the Urus, the Buffalo, the Bison, and the Bonassas. These have cloven hoofs, and chew the cud.

The third class is that of the Sheep kind; with cloven hoofs, and chewing the cud, like the former. In this is comprehended the Sheep, the Goat, the Lama, the Vigogne, the Gazella, the Guinea deer, and all of a similar form.

The fourth class is that of the Deer kind, with cloven hoofs, and with solid horns, that are shed every year. This class contains the Elk, the Rein-deer, the Stag, the Buck, the Roe-buck, and the Axis.

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The fifth class comprehends all those of the Hog kind, the Pecari, and the Bayberrouffa.

The sixth class is that numerous one of the Cat kind. This comprehends the Cat, the Lion, the Panther, the Leopard, the Jaguar, the Cougar, the Jaguarette, the Lynx, the Ounce, and the Catamountain. These are all carnivorous, and furnished with crooked claws, which they can sheath and unsheath at pleasure.

The seventh class is that of the Dog kind, carnivorous, and furnished with claws like the former, but which they cannot sheath. This class comprehends the Dog, the Wolf, the Fox, the Jackall, the Ifatis, the Hyena, the Civette, the Gibet, and the Genet.

The eighth class is that of the Weasil kind, with a long small body, with five toes, or claws, on each foot; the first of them separated from the rest like a thumb. This comprehends the Weasil, the Martin, the Pole-cat, the Ferrit, the Mangouft, the Vanfire, the Ermin, with all the varieties of the American Moufettes.

The ninth class is that of the Rabbit kind, with two large cutting teeth in each jaw. This comprehends the Rabbit, the Hare, the Guinea-pig, all the various species of the Squirrel, the Dormouse, the Marmotte, the Rat, the Mouse, the Agouti, the Paca, the Aperea, and the Tapeti.

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The tenth class is that of the Hedge-hog kind, with claw feet, and covered with prickles, comprehending the Hedge-hog and the Porcupine, the Couendou, and the Urson.

The eleventh class is that of the Tortoise kind, covered with a shell, or scales. This comprehends the Tortoise, the Pangolin, and the Phataguin.

The twelfth is of the Otter, or amphibious kind, comprehending the Otter, the Beaver, the Desman, the Morfe, and the Seal.

The thirteenth class is that of the Ape and Monkey kinds, with hands, and feet resembling hands.

The fifteenth class is that of winged quadrupedes, or the Bat kind, containing the Bat, the Flying Squirrel, and some other varieties.

The animals which seem to approach no other kind, either in nature, or in form, but to make each a distinct species in itself, are the following: the Elephant, the Rhinoceros, the Hippopotamos, the Camelopard, the Camel, the Bear, the Badger, the Tapir, the Cabiai, the Coati, the Ant-bear, the Tatou, and lastly the Sloth.

All other quadrupedes, whose name are not set down, will be found among some of the above-mentioned classes, and referred

to that which they most resemble. When, therefore, we are at a loss to know the name of any particular animal, by examining which of the known kinds it most resembles, either in shape, or in hoofs, or claws; and then, examining the particular description, we shall be able to discover not only its name, but its history. I have already said that all methods of this kind are merely arbitrary, and that Nature makes no exact distinction between her productions. It is hard, for instance, to tell whether we ought to refer the Civet to the dog, or the cat kind; but, if we know the exact history of the civet, it is no great matter to which kind we shall judge it to bear the greatest resemblance. It is enough that a distribution of this kind excites in us some rude out-lines of the make, or some marked similitudes in the nature of these animals; but, to know them with any precision, no system, or even description will serve, since the animal itself, or a good print of it, must be seen, and its history be read at length, before it can be said to be known. To pretend to say that we have an idea of a quadrupede, because we can tell the number, or the make of its teeth, or its paws, is as absurd as if we should pretend to distinguish men by the buttons on their cloaths. Indeed it often happens

happens that the quadrupede itself can be but seldom seen, that many of the more rare kinds do not come into Europe above once an age, and some of them have never been able to bear the removal; in such a case, therefore, there is no other substitute but a good print of the animal to give an idea of its figure; for no description whatsoever can answer this purpose so well. Mr. Locke, with his usual good sense, has observed, that a drawing of the animal, taken from the life, is one of the best methods of advancing natural history; and yet, most of our modern systematic writers are content rather with describing. Descriptions, no doubt, will go some way towards giving an idea of the figure of an animal; but they are certainly much the longest way about, and, as they are usually managed, by far the most obscure. In a drawing we can, at a single glance, gather more instruction than by a day's painful investigation of methodical systems, where we are told the proportions with great exactness, and yet remain ignorant of the totality. In fact, this method of describing all things is a fault that has infected many of our books, that treat on the meaner arts for this last age. They attempt to teach by words what is only to be learnt by practice and inspection. Most of

our dictionaries, and bodies of arts and sciences, are guilty of this error. Suppose, for instance, it be requisite to mention the manner of making shoes, it is plain that all the verbal instructions in the world will never give an adequate idea of this humble art, or teach a man to become a shoe-maker. A day or two in a shoe-maker's shop will answer the end better than a whole folio of instruction, which only serves to oppress the learner with the weight of its pretended importance. We have lately seen a laborious work carried on at Paris, with this only intent of teaching all the trades by description; however, the design at first blush seems to be ill considered; and it is probable that very few advantages will be derived from so laborious an undertaking. With regard to the descriptions in natural history, these, without all question, under the direction of good sense, are necessary; but still they should be kept within proper bounds; and, where a thing may be much more easily shewn than described, the exhibition should ever precede the account.

C H A P. XIV.

Of Quadrupedes in general compared to Man.

UPON comparing the various animals of the globe with each other, we shall find that Quadrupedes demand the rank immediately next ourselves ; and, consequently, come first in consideration. The similitude between the structure of their bodies and ours, those instincts which they enjoy in a superior degree to the rest, their constant services, or their unceasing hostilities, all render them the foremost objects of our curiosity, the most interesting parts of animated nature. These, however, although now so completely subdued, very probably, in the beginning, were nearer upon an equality with us, and disputed the possession of the earth. Man, while yet savage himself, was but ill qualified to civilize the forest. While yet naked, unarmed, and without shelter, every wild beast was a formidable rival ; and the destruction of such was the first employment of heroes. But, when he began to multiply, and arts to accumulate, he soon cleared the plains of the most noxious of these his rivals ; a part was taken under his protection

tection and care, while the rest found a precarious refuge in the burning desert, or the howling wilderness.

From being rivals, quadrupedes have now become the assistants of man; upon them he devolves the most laborious employments, and finds in them patient and humble coadjutors, ready to obey, and content with the smallest retribution. It was not, however, without long and repeated efforts that the independant spirit of these animals was broken; for the savage freedom, in wild animals, is generally found to pass down through several generations before it is totally subdued. Those cats and dogs that are taken from a state of natural wildness in the forest, still transmit their fierceness to their young: and, however concealed in general, it breaks out upon several occasions. Thus the assiduity and application of man in bringing them up, not only alters their disposition, but their very forms; and the difference between animals in a state of nature and domestic tameness is so considerable, that Mr. Buffon has taken this as a principal distinction in classing them.

In taking a cursory view of the form of quadrupedes, we may easily perceive that, of all the ranks of animated nature, they bear the nearest resemblance to man. This similitude will be
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found more striking when, erecting themselves on their hinder feet, they are taught to walk forward in an upright posture. We then see that all their extremities in a manner correspond with ours, and present us with a rude imitation of our own. In some of the ape kind the resemblance is so striking, that anatomists are puzzled to find in what part of the human body man's superiority consists; and scarce any but the metaphysician can draw the line that ultimately divides them.

But, if we compare their internal structure with our own, the likeness will be found still to encrease, and we shall perceive many advantages they enjoy in common with us, above the lower tribes of nature. Like us, they are placed above the class of birds by bringing forth their young alive; like us, they are placed above the class of fishes, by breathing through the lungs; like us, they are placed above the class of insects, by having red blood circulating through their veins; and lastly, like us, they are different from almost all the other classes of animated nature, being either wholly or partly covered with hair. Thus nearly are we represented in point of conformation to the class of animals immediately below us; and this shews what little reason we have to be proud of

of our persons alone, to the perfection of which quadrupedes make such very near approaches.

The similitude of quadrupedes to man obtains also in the fixedness of their nature, and their being less apt to be changed by the influence of climate or food than the lower ranks of nature. * Birds are found very apt to alter both in colour and size; fishes, likewise, still more; insects may be quickly brought to change and adapt themselves to the climate; and, if we descend to plants, which may be allowed to have a kind of living existence, their kinds may be surprizingly and readily altered, and taught to assume new forms. The figure of every animal may be considered as a kind of drapery, which it may be made to put on or off by human assiduity; in man the drapery is almost invariable; in quadrupedes it admits of some variation; and the variety may be made greater still as we descend to the inferior classes of animal existence.

Quadrupedes, although they are thus strongly marked, and in general divided from the various kinds around them, yet, still some of them are often of so equivocal a nature, that it is hard to tell whether they ought to be ranked in the quadrupede class,

* Buffon, vol. xviii. p. 179.

class, or degraded to those below them. If, for instance, we were to marshal the whole groupe of animals round man, placing the most perfect next him, and those most equivocal near the classes they most approach, we should find it difficult, after the principal had taken their stations near him, where to place many that lie at the out-skirts of this phalanx. The bat makes a near approach to the aerial tribe, and might by some be reckoned among the birds. The porcupine has not less pretensions to that class, being covered with quills, and shewing that birds are not the only part of nature that are furnished with such a defence. The armadilla might be referred to the tribe of insects, or snails, being, like them, covered with a shell; the seal and the morse might be ranked among the fishes, like them being furnished with fins, and almost constantly residing in the same element. All these, the farther they recede from the human figure become less perfect, and may be considered as the lowest kinds of that class to which we have referred them.

But, although the variety in quadrupedes is thus great, they all seem well adapted to the stations in which they are placed. There is scarce one of them, how rudely shaped soever, that is not formed to enjoy a
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state of happiness fitted to its nature. All its deformities are only relative to us, but all its enjoyments are peculiarly its own. We may superficially suppose the sloth, that takes up months in climbing a single tree, or the Mole, whose eyes are too small for distinct vision, are wretched and helpless creatures; but it is probable that their life, with respect to themselves, is a life of luxury; the most pleasing food is easily obtained; and, as they are abridged in one pleasure, it may be doubled in those which remain. Quadrupedes, and all the lower kinds of animals, have, at worst, but the torments of immediate evil to encounter, and this is but transient and accidental; man has two sources of calamity, that which he foresees as well as that which he feels; so that, if his reward were to be in this life alone, then, indeed, would he be of all beings the most wretched.

The heads of quadrupedes, though differing from each other, are in general adapted to their way of living. In some it is sharp, the better to fit the animal for turning up the earth in which its food lies. In some it is long, in order to give a greater room for the olfactory nerves, as in dogs, who are to hunt and find out their prey by the scent. In others it is short and thick, as in the lion, to encrease the strength
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of the jaw, and to fit it the better for combat. In quadrupedes, that feed upon grafs, they are enabled to hold down their heads to the ground, by a strong tendinous ligament, that runs from the head to the middle of the back. This serves to raise the head, although it has been held to the ground for several hours, without any labour, or any assistance from the muscles of the neck.

The teeth of all animals are entirely fitted to the nature of their food. Those of such as live upon flesh differ in every respect from such as live upon vegetables. In the latter they seem entirely made for gathering and bruising their simple food, being edged before and fitted for cutting; but broad towards the back of the jaw, and fitted for pounding. In the carnivorous kinds they are sharp before, and fitted rather for holding than dividing. In the one the teeth serve as grindstones, in the other as weapons of defence; in both, however, the surface of those teeth which serve for grinding are unequal; the cavities and risings fitting those of the opposite so as to tally exactly when the jaws are brought together. These inequalities better serve for comminuting the food; but they become smooth with age; and, for this reason, old animals

mals take a longer time to chew their food than such as are in the vigour of life.

Their legs are not better fitted than their teeth to their respective wants or enjoyments. In some they are made for strength only, and to support a vast unwieldy frame, without much flexibility or beautiful proportion. Thus the legs of the elephant, the rhinoceros, and the sea-horse, resemble pillars; were they made smaller, they would be unfit to support the body; were they endowed with greater flexibility, or swiftness, that would be needless, as they do not pursue other animals for food; and, conscious of their own superior strength, there are none that they deign to avoid. Deers, hares, and other creatures, that are to find safety only in flight, have their legs made entirely for speed; they are slender and nervous. Were it not for this advantage, every carnivorous animal would soon make them a prey, and their races would be entirely extinguished. But, in the present state of nature, the means of safety are rather superior to those of offence; and the pursuing animal must owe success only to patience, perseverance, and industry. The feet of some, that live upon fish alone, are made for swimming. The toes of these animals are joined together with membranes, being web-footed,

footed, like a goose or a duck, by which they swim with great rapidity. Those animals that lead a life of hostility, and live upon others, have their feet armed with sharp claws, which some can sheath and un-sheath at will. Those, on the contrary, who lead peaceful lives, have generally hoofs, which serve some as weapons of defence; and which in all are better fitted for traversing extensive tracts of rugged country, than the claw foot of their pursuers.

The stomach is generally proportioned to the quality of the animal's food, or the ease with which it is obtained. In those that live upon flesh and such nourishing substances, it is small and glandular, affording such juices as are best adapted to digest its contents; their intestines also, are short and without fatness. On the contrary, such animals as feed entirely upon vegetables have the stomach very large; and those who chew the cud have no less than four stomachs, all which serve as so many laboratories, to prepare and turn their coarse food into proper nourishment. In Africa, where the plants happen to afford greater nourishment than in our temperate climates, several animals, that with us have four stomachs, have there but two.* However, in all animals

* Buffon.

animals the size of the intestines are proportioned to the nature of the food; where that is furnished in large quantities, the stomach dilates to answer the encrease. In domestic animals, that are plentifully supplied, it is large; in the wild animals, that live precariously, it is much more contracted, and the intestines are much shorter.

In this manner, all animals are fitted by nature to fill up some peculiar station. The greatest animals are made for an inoffensive life, to range the plains and the forest without injuring others; to live upon the productions of the earth, the grass of the field, or the tender branches of trees. These, secure in their own strength, neither fly from any other quadrupedes, nor yet attack them: Nature, to the greatest strength has added the most gentle and harmless dispositions; without this, those enormous creatures would be more than a match for all the rest of the creation; for what devastation might not ensue were the elephant, or the rhinoceros, or the buffalo, as fierce and as mischievous as the tiger or the rat? In order to oppose these larger animals, and in some measure to prevent their exuberance, there is a species of the carnivorous kind, of inferior strength indeed, but of greater activity and cunning. The lion and the tiger generally watch for the larger kinds of
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of prey, attack them at some disadvantage, and commonly jump upon them by surprise. None of the carnivorous kinds, except the dog alone, will make a voluntary attack, but with the odds on their side. They are all cowards by nature, and usually catch their prey by a bound from some lurking place, seldom attempting to invade them openly ; for the larger beasts are too powerful for them, and the smaller too swift.

A lion does not willingly attack an horse ; and then only when compelled by the keenest hunger. The combats between a lion and a horse are frequent enough in Italy ; where they are both inclosed in a kind of amphitheatre, fitted for that purpose. The lion always approaches wheeling about, while the horse presents his hinder parts to the enemy. The lion in this manner goes round and round, still narrowing his circle, till he comes to the proper distance to make his spring ; just at the time the lion springs, the horse lashes with both legs from behind, and, in general, the odds are in his favour ; it more often happening that the lion is stunned, and struck motionless by the blow, than that he effects his jump between the horse's shoulders. If the lion is stunned, and left sprawling, the horse escapes, without attempting to improve his victory ; but
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if the lion succeeds, he sticks to his prey, and tears the horse in pieces in a very short time.

But it is not among the larger animals of the forest alone, that these hostilities are carried on ; there is a minuter, and a still more treacherous contest between the lower ranks of quadrupedes. The panther hunts for the sheep and the goat ; the catamountain, for the hare or the rabbit ; and the wild cat, for the squirrel or the mouse. In proportion as each carnivorous animal wants strength, it uses all the assistance of patience, assiduity, and cunning. However, the arts of these to pursue, are not so great as the tricks of their prey to escape ; so that the power of destruction in one class, is inferior to the power of safety in the other. Were this otherwise, the forest would soon be dispeopled of the feeble races of animals ; and beasts of prey themselves, would want, at one time, that subsistence which they lavishly destroyed at another.

Few wild animals seek their prey in the day-time ; they are then generally deterred by their fears of man in the inhabited countries, and by the excessive heat of the sun in those extensive forests that lie towards the south, and in which they

they reign the undisputed tyrants. As soon as the morning, therefore, appears, the carnivorous animals retire to their dens; and the elephant, the horse, the deer, and all the hare kinds, those inoffensive tenants of the plain, make their appearance. But again, at night-fall, the state of hostility begins: the whole forest then echoes to a variety of different howlings. Nothing sùre can be more terrible than an African landscape at the close of evening: the deep-toned roarings of the lion; the shriller yellings of the tyger; the jackall, pursuing by the scent, and barking like a dog; the hyæna, with a note peculiarly solitary and dreadful; but to crown all, the hissing of the various kinds of serpents, that at that time begin their call, and, as I am assured, make a much louder symphony than the birds in our groves in a morning.

Beasts of prey seldom devour each other; nor can any thing but the greatest degree of hunger induce them to it. What they chiefly seek after, is the deer, or the goat; those harmless creatures, that seem made to embellish nature. These are either pursued or surprized, and afford the most agreeable repast to their destroyers. The most usual method with even the fiercest animals, is to hide and crouch near some path frequented

by their prey ; or some water, where cattle come to drink ; and seize them at once with a bound. The lion and the tyger leap twenty feet at a spring ; and this, rather than their swiftness or strength, is what they have most to depend upon for a supply. There is scarce one of the deer or hare kind, that is not very easily capable of escaping them by its swiftness ; so that whenever any of these fall a prey, it must be owing to their own inattention.

But there is another class of the carnivorous kind, that hunt by the scent, and which it is much more difficult to escape. It is remarkable, that all animals of this kind pursue in a pack ; and encourage each other by their mutual cries. The jackall, the syagush, the wolf, and the dog, are of this kind : they pursue with patience rather than swiftness ; their prey flies at first, and leaves them for miles behind ; but they keep on with a constant steady pace, and excite each other by a general spirit of industry and emulation, till at last they share the common plunder. But it too often happens, that the larger beasts of prey, when they hear a cry of this kind begun, pursue the pack, and when they have hunted down the animal, come in and monopolize the spoil. This has given rise to the report of the jackall's being the lion's provider ;

vider; when the reality is, that the jackall hunts for itself, and the lion is an unwelcome intruder upon the fruits of his toil.

Nevertheless, with all the powers which carnivorous animals are possessed of, they generally lead a life of famine and fatigue. Their prey has such a variety of methods for escaping, that they sometimes continue without food for a fortnight together: but nature has endowed them with a degree of patience, equal to the severity of their state; so that as their subsistence is precarious, their appetites are complying. They usually seize their prey with a roar, either of seeming delight, or perhaps to terrify it from resistance. They frequently devour it, bones and all, in the most ravenous manner; and then retire to their dens, continuing inactive till the calls of hunger again excite their courage and industry. But as all their methods of pursuit are counteracted by the arts of evasion, they often continue to range without success, supporting a state of famine for several days, nay, sometimes, weeks together. Of their prey, some find protection in holes, in which nature has directed them to bury themselves; some find safety by swiftness; and such as are possessed of neither of these advantages, generally herd together, and

endeavour to repel invasion by united force. The very sheep, which to us seem so defenceless, are by no means so in a state of nature; they are furnished with arms of defence, and a very great degree of swiftness; but they are still further assisted by their spirit of mutual defence: the females fall into the center; and the males, forming a ring round them, oppose their horns to the assailants. Some animals, that feed upon fruits which are to be found only at one time of the year, fill their holes with several sorts of plants, which enable them to lie concealed during the hard frosts of the winter, contented with their prison, since it affords them plenty and protection. These holes are dug with so much art, that there seems the design of an architect in the formation. There are usually two apertures, by one of which the little inhabitant can always escape. when the enemy is in possession of the other. Many creatures are equally careful of avoiding their enemies, by placing a centinel, to warn them of the approach of danger. These generally perform this duty by turns; and they know how to punish such as have neglected their post, or have been unmindful of the common safety. Such are a part of the efforts that the weaker races of quadrupeds exert, to avoid their invaders; and,

and, in general, they are attended with success. The arts of instinct are most commonly found an overmatch for the invasions of instinct. Man is the only creature against whom all their little tricks can scarce prevail. Wherever he has spread his dominion, scarce any flight can save, or any retreat harbour; wherever he comes, terror seems to follow, and all society ceases among the inferior tenants of the plain; their union against him can yield them no protection, and their cunning is but weakness. In their fellow brutes, they have an enemy whom they can oppose with an equality of advantage; they can oppose fraud or swiftness to force; or numbers to invasion: but what can be done against such an enemy as man, who finds them out though unseen, and though remote destroys them? Wherever he comes, all the contest among the meaner ranks seems to be at an end, or is carried on only by surprize. Such as he has thought proper to protect, have calmly submitted to his protection; such as he has found it convenient to destroy, carry on an unequal war, and their numbers are every day decreasing.

The wild animal is subject to few alterations; and, in a state of savage nature, continues for ages the same, in size, shape, and colour. But it is otherwise when subdued,
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and taken under the protection of man; its external form, and even its internal structure, are altered by human assiduity: and this is one of the first and greatest causes of the variety that we see among the several quadrupedes of the same species. Man appears to have changed the very nature of domestic animals, by cultivation and care. A domestic animal is a slave that seems to have few other desires but such as man is willing to allow it. Humble, patient, resigned, and attentive, it fills up the duties of its station; ready for labour, and content with subsistence.

Almost all domestic animals seem to bear the marks of servitude strong upon them. All the varieties in their colour, all the fineness and length of their hair, together with the depending length of their ears, seem to have arisen from a long continuance of domestic slavery. What an immense variety is there to be found in the ordinary race of dogs and horses! the principal differences of which have been effected by the industry of man, so adapting the food, the treatment, the labour, and the climate, that nature seems almost to have forgotten her original design; and the tame animal no longer bears any resemblance to its ancestors in the woods around him.

In this manner, nature is under a kind of
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constraint, in those animals we have taught to live in a state of servitude near us. The savage animals preserve the marks of their first formation; their colours are generally the same; a rough dusky brown, or a tawny, seem almost their only varieties. But it is otherwise in the tame; their colours are various, and their forms different from each other. The nature of the climate, indeed, operates upon all; but more particularly on these. That nourishment which is prepared by the hand of man, chosen not to their appetites, but to suit his own convenience, that climate the rigours of which he can soften, and that employment to which they are sometimes assigned, produce a number of distinctions that are not to be found among the savage animals. These at first were accidental, but in time became hereditary; and a new race of artificial monsters are propagated, rather to answer the purposes of human pleasure, than their own convenience. In short, their very appetites may be changed; and those that feed only upon grass, may be rendered carnivorous. I have seen a sheep that would eat flesh, and an horse that was fond of oysters.

But not their appetites, or their figure alone, but their very dispositions, and their natural sagacity, are altered by the vicinity
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of man. In those countries, where men have seldom intruded, some animals have been found, established in a kind of civil state of society. Remote from the tyranny of man, they seem to have a spirit of mutual benevolence, and mutual friendship. The beavers, in these distant solitudes, are known to build like architects, and rule like citizens. The habitations that these have been seen to erect, exceed the houses of the human inhabitants of the same country, both in neatness and convenience. But as soon as man intrudes upon their society, they seem impressed with the terrors of their inferior situation, their spirit of society ceases, the bond is dissolved, and every animal looks for safety in solitude, and there tries all its little industry to shift only for itself.

Next to human influence, the climate seems to have the strongest effects both upon the nature and the form of quadrupedes. As in man, we have seen some alterations, produced by the variety of his situation; so in the lower ranks, that are more subject to variation, the influence of climate is more readily perceived. As these are more nearly attached to the earth, and in a manner connected to the soil; as they have none of the arts of shielding off the inclemency of the weather, or softening the
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the rigours of the sun, they are consequently more changed by its variations. In general, it may be remarked, that the colder the country, the larger and the warmer is the fur of each animal; it being wisely provided by nature, that the inhabitant should be adapted to the rigours of its situation. Thus the fox and wolf, which in temperate climates have but short hair, have a fine long fur in the frozen regions near the pole. On the contrary, those dogs which with us have long hair, when carried to Guinea, or Angola, in a short time cast their thick covering, and assume a lighter dress, and one more adapted to the warmth of the country. The beaver, and the ermine, which are found in the greatest plenty in the cold regions, are remarkable for the warmth and delicacy of their furs; while the elephant, and the rhinoceros, that are natives of the line, have scarce any hair at all. Not but that human industry can, in some measure, co-operate with, or repress the effects of climate in this particular. It is well known what alterations are produced by proper care, in the sheep's fleece, in different parts of our own country; and the same industry is pursued with a like success in Syria, where many of their animals are cloathed with a long and beautiful hair, which they take care to improve,

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as they work it into that stuff called camblet, so well known in different parts of Europe.

The disposition of the animal seems also not less marked by the climate than the figure. The same causes that seem to have rendered the human inhabitants of the rigorous climates savage and ignorant, have also operated upon their animals. Both at the line and the pole, the wild quadrupedes are fierce and untameable. In these latitudes, their savage dispositions having not been quelled by any efforts from man, and being still farther stimulated by the severity of the weather, they continue fierce and untractable. Most of the attempts which have hitherto been made to tame the wild beasts brought home from the pole or the equator, have proved ineffectual. They are gentle and harmless enough while young; but as they grow up, they acquire their natural ferocity, and snap at the hand that feeds them. It may indeed, in general, be asserted, that in all countries, where the men are most barbarous, the beasts are most fierce and cruel: and this is but a natural consequence of the struggle between man and the more savage animals of the forest; for in proportion as he is weak and timid, they must be bold and intrusive; in proportion as his dominion is but feebly supported, their

their rapacity must be more obnoxious. In the extensive countries, therefore, lying round the pole, or beneath the line, the quadrupedes are fierce and formidable. Africa has ever been remarked for the brutality of its men, and the fierceness of its animals : its lions and its leopards are not less terrible than its crocodiles and its serpents ; their dispositions seem entirely marked with the rigours of the climate ; and being bred in an extreme of heat, they shew a peculiar ferocity, that neither the force of man can conquer, nor his arts allay. However, it is happy for the wretched inhabitants of those climates, that its most formidable animals are all solitary ones ; that they have not yet learnt the art of uniting, to oppress mankind ; but each depending on its own strength, invades without any assistant.

The food also is another cause in the variety, which we find among quadrupedes of the same kind. Thus the beasts which feed in the valley are generally larger than those which glean a scanty subsistence on the mountain. Such as live in the warm climates, where the plants are much larger and more succulent than with us, are equally remarkable for their bulk. The ox fed in the plains of Indostan, is very much larger than that which is more hardily maintained

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on the side of the Alps. The deserts of Africa, where the plants are extremely nourishing, produce the largest and fiercest animals ; and perhaps, for a contrary reason, America is found not to produce such large animals as are seen in the ancient continent. But, whatever be the reason, the fact is certain, that while America exceeds us in the size of its reptiles of all kinds, it is far inferior in its quadrupede productions. Thus, for instance, the largest animal of that country is the tapir, which can by no means be compared to the elephant of Africa. Its beasts of prey also, are divested of that strength and courage which is so dangerous in this part of the world. The American lion, tyger, and leopard, if such diminutive creatures deserve these names, are neither so fierce nor so valiant as those of Africa and Asia. The tyger of Bengal has been seen to measure twelve feet in length, without including the tail ; whereas the American tyger seldom exceeds three. This difference obtains still more in the other animals of that country, so that some have been of opinion * that all quadrupedes in Southern America are of a different species from those most resembling them in the old world : and that there are none
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* Buffon.

which are common to both but such as have entered America by the north ; and which, being able to bear the rigours of the frozen pole, have travelled from the ancient continent, by that passage, into the new. Thus the bear, the wolf, the elk, the stag, the fox, and the beaver, are known to the inhabitants as well of North America as of Russia ; while most of the various kinds to the southward, in both continents, bear no resemblance to each other. Upon the whole, such as peculiarly belong to the new continent are without any marks of the quadrupede perfection. They are almost wholly destitute of the power of defence ; they have neither formidable teeth, horns, or tail ; their figure is ungainly, and their limbs ill proportioned. Some among them, such as the ant-bear, and the sloth, appear so miserably formed as scarce to have the power of moving and eating. They, seemingly, drag out a miserable and languid existence in the most desert solitude ; and would quickly have been destroyed in a country where there were inhabitants, or powerful beasts to oppose them.

But if the quadrupedes of the new continent be less, they are found in much greater abundance ; for it is a rule that obtains through nature, that the smallest animals multiply

multiply the fastest. The goat, imported from Europe to South America, soon begins to degenerate; but as it grows less it becomes more prolific; and, instead of one kid at a time, or two at the most, it generally produces five, and sometimes more. What there is in the food, or the climate, that produces this change, we have not been able to learn; we might be apt to ascribe it to the heat, but that on the African coast, where it is still hotter, this rule does not obtain; for the goat, instead of degenerating there, seems rather to improve.

However, the rule is general among all quadrupedes, that those which are large and formidable produce but few at a time; while such as are mean and contemptible are extremely prolific. The lion, or tyger, have seldom above two cubs at a litter; while the cat, that is of a similar nature, is usually seen to have five or six. In this manner, the lower tribes become extremely numerous; and, but for this surprizing fecundity, from their natural weakness, they would quickly be extirpated. The breed of mice, for instance, would have long since been blotted from the earth, were the mouse as slow in production as the elephant. But it has been wisely provided that such animals as can make but little
resistance,

resistance, should at least have a means of repairing the destruction, which they must often suffer, by their quick reproduction ; that they should encrease even among enemies, and multiply under the hand of the destroyer. On the other hand, it has as wisely been ordered by Providence, that the larger kinds should produce but slowly ; otherwise, as they require proportional supplies from nature, they would quickly consume their own stores ; and, of consequence, many of them would soon perish through want ; so that life would thus be given without the necessary means of subsistence. In a word, Providence has most wisely balanced the strength of the great against the weakness of the little. Since it was necessary that some should be great and others mean, since it was expedient that some should live upon others, it has assisted the weakness of one by granting it fruitfulness ; and diminished the numbers of the other by infecundity.

In consequence of this provision, the larger creatures, which bring forth few at a time, seldom begin to generate till they have nearly acquired their full growth. On the contrary, those which bring many, reproduce before they have arrived at half their natural size. Thus the horse and the bull are nearly at their best before they begin

begin to breed; the hog and the rabbit scarce leave the teat before they become parents in turn. Almost all animals likewise continue the time of their pregnancy in proportion to their size. The mare continues eleven months with foal, the cow nine, the wolf five, and the bitch nine weeks. In all, the intermediate litters are the most fruitful; the first and the last generally producing the fewest in number and the worst of the kind.

Whatever be the natural disposition of animals at other times, they all acquire new courage when they consider themselves as defending their young. No terrors can then drive them from the post of duty; the mildest begin to exert their little force, and resist the most formidable enemy. Where resistance is hopeless, they then incur every danger, in order to rescue their young by flight, and retard their own expedition by providing for their little ones. When the female opossum, an animal of America, is pursued, she instantly takes her young into a false belly, with which nature has supplied her, and carries them off, or dies in the endeavour. I have been lately assured of a she-fox which, when hunted, took her cub in her mouth, and ran for several miles without quitting it, until at last she was forced to leave it
behind

behind, upon the approach of a mastiff, as she ran through a farmer's yard. But, if at this period the mildest animals acquire new fierceness, how formidable must those be that subsist by rapine ! At such times, no obstacles can stop their ravage, and no threats can terrify ; the lioness then seems more hardy than even the lion himself. She attacks men and beasts indiscriminately, and carries all she can overcome reeking to her cubs, whom she thus early accustoms to slaughter. Milk, in the carnivorous animals, is much more sparing than in others ; and it may be for this reason that all such carry home their prey alive, that, in feeding their young, its blood may supply the deficiencies of nature, and serve instead of that milk, with which they are so sparingly supplied.

Nature, that has thus given them courage to defend their young, has given them instinct to chuse the proper times of copulation, so as to bring forth when the provision suited to each kind is to be found in the greatest plenty. The wolf, for instance, couples in December, so that the time of pregnancy continuing five months, it may have its young in April. The mare, who goes eleven months, admits the horse in summer, in order to foal about the be-

ginning of May. On the contrary, those animals which lay up provisions for the winter, such as the beaver and the marmotte, couple in the latter end of autumn, so as to have their young about January, against which season they have provided a very comfortable store. These seasons for coupling, however, among some of the domestic kinds, are generally in consequence of the quantity of provisions with which they are at any time supplied. Thus we may, by feeding any of these animals, and keeping off the rigour of the climate, make them breed whenever we please. In this manner those contrive who produce lambs all the year round.

The choice of situation in bringing forth is also very remarkable. In most of the rapacious kinds, the female takes the utmost precautions to hide the place of her retreat from the male; who otherwise, when pressed by hunger, would be apt to devour her cubs. She seldom, therefore, strays far from the den, and never approaches it while he is in view, nor visits him again till her young are capable of providing for themselves. Such animals as are of tender constitutions take the utmost care to provide a place of warmth as well as safety, for their young; the rapacious kinds bring forth in the thickest woods; those
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that chew the cud, with the various tribes of the vermin kind, choose some hiding place in the neighbourhood of man. Some dig holes in the ground; some choose the hollow of a tree; and all the amphibious kinds bring up their young near the water, and accustom them betimes to their proper element.

Thus Nature seems kindly careful for the protection of the meanest of her creatures; but there is one class of quadrupedes that seems entirely left to chance, that no parent stands forth to protect, and no instructor leads, to teach the arts of subsistence. These are the quadrupedes that are brought forth from the egg, such as the lizard, the tortoise, and the crocodile. The fecundity of all other animals compared with these is sterility itself. These bring forth above two hundred at a time; but, as the offspring is more numerous, the parental care is less exerted. Thus the numerous brood of eggs are, without farther solicitude, buried in the warm sands of the shore, and the heat of the sun alone is left to bring them to perfection. To this perfection they arrive almost as soon as disengaged from the shell. Most of them, without any other guide than instinct, immediately make to the water. In their passage thither, they have numberless ene-

mies to fear. The birds of prey that haunt the shore, the beasts that accidentally come that way, and even the animals themselves that give them birth are known with a strange rapacity, to thin their numbers as well as the rest.

But it is kindly ordered by Providence, that these animals which are mostly noxious, should thus have many destroyers ; were it not for this, by their extreme fecundity, they would soon over-run the earth, and cumber all our plains with deformity.



CHAP.

C H A P. XV.

Of the Horfe. *

ANIMALS of the horfe kind deserve a place next to man, in an history of nature. Their activity, their strength, their usefulness,

* As it may happen that, in a description where it is the aim rather to insert what is not usually known, than all that is known, some of the more obvious particulars may be omitted; I will take leave to subjoin in the notes the characteristic marks of each animal, as given us by Linnaeus. The horfe, with six cutting teeth before; and single hoofed; a native of Europe and the East; (but I rather believe of Africa) a generous, proud, and strong animal; fit either for the draught, the course, or the road; he is delighted with woods; he takes care of his hinder parts; defends himself from the flies with his tail; scratches his fellow; defends its young; calls by neighing; sleeps after night-fall; fights by kicking, and by biting also; rolls on the ground when he sweats; eats the grass closer than the ox; distributes the seed by dunging; wants a gall bladder; never vomits; the foal is produced with the feet stretched out; he is injured by being struck on the ear; upon the stifle; by being caught by the nose in barnacles; by having his teeth rubbed with tallow; by the herb padus; by the herb phalandria; by the cruculio; by the conops. His diseases are different in different countries. A consumption of the ethmoid bones of the nose, called the glanders, is with us the most infectious and fatal. He eats hemlock without injury. The mare goes with foal 290 days. The placenta is not fixed. He acquires the canine teeth not till the age of five years.

ness, and their beauty, all contribute to render them the principal objects of our curiosity and care ; a race of creatures in whose welfare we are interested next to our own.

Of all the quadrupede animals, the horse seems the most beautiful ; the noble largeness of his form, the glossy smoothness of his skin, the graceful ease of his motions, and the exact symmetry of his shape, have taught us to regard him as the first, and as the most perfectly formed ; and yet, what is extraordinary enough, if we examine him internally, his structure will be found the most different from that of man of all other quadrupedes whatsoever. As the ape approaches us the nearest in internal conformation, so the horse is the most remote ; * a striking proof that there may be oppositions of beauty, and that all grace is not to be referred to one standard.

To have an idea of this noble animal in his native simplicity, we are not to look for him in the pastures, or the stables, to which he has been consigned by man ; but in those wild and extensive plains where he has been originally produced, where he ranges without controul, and riots in all the variety of luxurious nature.

In

* Histoire Naturelle, Daubenton, vol. vii. p. 374.

In this state of happy independence, he disdains the assistance of man, which only tends to servitude. In those boundless tracts, whether of Africa, or New Spain, where he runs at liberty, he seems no way incommoded with the inconveniencies to which he is subject in Europe. The continual verdure of the fields supplies his wants; and the climate that never knows a winter suits his constitution, which naturally seems adapted to heat. His enemies of the forest are but few, for none but the greater kinds will venture to attack him; any one of these he is singly able to overcome; while at the same time he is content to find safety in society; for the wild horses of those countries always herd together.

In these countries, therefore, the horses are often seen feeding in droves of five or six hundred. As they do not carry on war against any other race of animals, they are satisfied to remain entirely upon the defensive. The pastures on which they live satisfy all their appetites, and all other precautions are purely for their security, in case of a surprize. As they are never attacked but at a disadvantage, whenever they sleep in the forests, they have always one among their number that stands as centinel,

centinel, to give notice of any approaching danger; and this office they take by turns.* If a man approaches them while they are feeding by day, their centinel walks up boldly near him, as if to examine his strength, or to intimidate him from proceeding; but, as the man approaches within pistol shot, the centinel then thinks it high time to alarm his fellows; this he does by a loud kind of snorting, upon which they all take the signal, and fly off with the speed of the wind; their faithful centinel bringing up the rear.†

It is not easy to say from what country the horse came originally. It should seem that the colder climates do not agree with his constitution; for, although he is found almost in them all, yet his form is altered there, and he is found at once diminutive and ill shaped. We have the testimony of the ancients that there were wild horses once in Europe; at present, however, they are totally brought under subjection; and even those which are found in America are of a Spanish breed, which being sent thither upon its first discovery, have since become wild, and have spread over all the south
of

* Dictionnaire Universelle, Des Animaux, p. 19.

† Labat. tome vii.

of that vast continent, almost to the Straights of Magellan. These, in general, are a small breed, of about fourteen hands high. They have thick jaws and clumsy joints; their ears and neck also are long; they are easily tamed; for the horse by nature is a gentle complying creature, and resists rather from fear than obstinacy. They are caught by a kind of nooze, and then held fast by the legs, and tyed to a tree, where they are left for two days, without food or drink. By that time, they begin to grow manageable; and in some weeks they become as tame as if they had never been in a state of wildness. If by any accident they are once more set at liberty, they never become wild again, but know their masters, and come to their call. Some of the buccaneers have often been agreeably surprized, after a long absence, to see their faithful horses once more present themselves, with their usual assiduity; and come up, with fond submission, to receive the rein.

These American horses, however, cannot properly be ranked among the wild races, since they were originally bred from such as were tame. It is not in the new, but the old world that we are to look for this animal, in a true state of nature; in the
extensive

extensive deserts of Africa, in Arabia, and those wide-spread countries that separate Tartary from the more southern nations. Vast droves of these animals are seen wild among the Tartars: they are of a small breed, extremely swift, and very readily evade their pursuers. As they go together, they will not admit of any strange animals among them, though even of their own kind. Whenever they find a tame horse attempting to associate with them, they instantly gather round him, and soon oblige him to seek safety by flight. There are vast numbers also of wild horses to the north of China, but they are of a weak timid breed; small of stature and useless in war.

At the Cape of Good Hope also there are numbers of horses, in a state of nature, but small, vicious, and untameable. They are found wild also in several other parts of Africa; but the wretched inhabitants of that country either want the art to tame them, or seem ignorant of their uses. It is common with the Negroes, who are carried over from thence to America, when they first see an horse, to testify both terror and surprize. These poor men seem not to have any knowledge of such a creature; and, though the horse is probably a native of their own country, they have let all the rest
of

of mankind enjoy the benefit of his services, without turning them to any advantage at home. In some parts of Africa, therefore, where the horse runs wild, the natives seem to consider him rather in the light of a dainty, for food, than a useful creature, capable of assisting them either in war or in labour: riding seems a refinement that the natives of Angola, or Caffraria, have not as yet been able to attain to; and whenever they catch an horse, it is only with an intent to eat him.

But of all countries in the world, where the horse runs wild, Arabia produces the most beautiful breed, the most generous, swift, and persevering. They are found, though not in great numbers, in the deserts of that country; and the natives use every stratagem to take them. Although they are active and beautiful, yet they are not so large as those that are bred up tame; they are of a brown colour; their mane and tail very short, and the hair black and tufted. * Their swiftness is incredible: the attempt to pursue them in the usual manner of the chase, with dogs, would be entirely fruitless. Such is the rapidity of their flight, that they are instantly out of view, and the dogs themselves give up the vain pursuit.

* Marm. Descript. de l'Afrique, l. 1, p 51.

suit. The only method, therefore, of taking them is by traps, hidden in the sand, which entangling their feet, the hunter at length comes up, and either kills them or carries them home alive. If the horse be young, he is considered among the Arabians as a very great delicacy; and they feast upon him while any part is found remaining; but if, from his shape or vigour, he promises to be serviceable in his more noble capacity, they take the usual methods of taming him, by fatigue and hunger, and he soon becomes an useful domestic animal.

The usual manner of trying their swiftness is by hunting the ostrich: the horse is the only animal whose speed is comparable to that of this creature, which is found in the sandy plains, with which those countries abound. The instant the ostrich perceives itself aimed at, it makes to the mountains, while the horseman pursues with all the swiftness possible, and endeavours to cut off his retreat. The chase then continues along the plain, while the ostrich makes use of both legs and wings to assist its motion. However, an horse of the first speed is able to out-run it; so that the poor animal is then obliged to have recourse to art to elude the hunter, by frequently turning: at length, finding all escape hopeless, it,
hides

hides its head wherever it can, and suffers itself tamely to be taken. If the horse, in a trial of this kind, shews great speed, and is not readily tired, his price becomes proportionably great; and there are some horses valued at a thousand ducats.

But the horses thus caught, or trained in this manner, are at present but very few; the value of Arabian horses, over all the world, has in a great measure thinned the deserts of the wild breed; and there are very few to be found in those countries, except such as are tame. The Arabians, as we are told by historians, first began the management of horses in the time of Sheick Ismael. Before that they wandered wild along the face of the country, neglected and useless; but the natives then first began to tame their fierceness, and to improve their beauty; so that at present they possess a race of the most beautiful horses in the whole world, with which they drive a trade, and furnish the stables of princes at immense prices.

There is scarce an Arabian, how poor soever, but is provided with his horse.* They, in general, make use of mares in their ordinary excursions; experience having taught them that they support fatigue, thirst, and

* Buffon.

and hunger, better than the horses are found to do. They are also less vicious, of a gentler nature, and are not so apt to neigh. They are more harmless also among themselves, not so apt to kick or hurt each other, but remain whole days together, without the least mischief. The Turks, on the contrary, are not fond of mares; and the Arabians sell them such horses as they do not chuse to keep for stallions at home. They preserve the pedigree of their horses with great care, and for several ages back. They know their alliances, and all their genealogy; they distinguish the races by different names, and divide them into three classes. The first is that of the nobles, the ancient breed, and adulterated on either side: the second is that of the horses of the ancient race, but unadulterated; and the third is that of the common and inferior kind: the last they sell at a low price; but those of the first class, and even of the second, amongst which are found horses of equal value to the former, are sold extremely dear. They know, by long experience, the race of an horse by his appearance; they can tell the name, the surname, the colour, and the marks properly belonging to each. When they are not possessed of stallions of the noble race themselves, for their mares, they borrow from
their

their neighbours, paying a proper price as with us, and receive a written attestation of the whole. In this attestation is contained the name of the horse and the mare, and their respective genealogies. When the mare has produced her foal, new witnesses are called, and a new attestation signed, in which are described the marks of the foal, and the day noted when it was brought forth. These attestations encrease the value of the horse; and they are given to the person who buys him. The most ordinary mare of this race sells for five hundred crowns; there are many that sell for a thousand; and some of the very finest kinds for fourteen or fifteen hundred pounds. As the Arabians have no other house but a tent to live in, this also serves them for a stable; so that the mare, the foal, the husband, the wife, and the children, lie all together indiscriminately; the little children are often seen upon the body, or the neck of the mare, while these continue inoffensive and harmless, permitting them thus to play with, and caress them without any injury. The Arabians never beat their horses: they treat them gently; they speak to them, and seem to hold a discourse; they use them as friends, they never attempt to encrease their speed by the whip, nor spur them but in cases of necessity.

cessity. However, when this happens, they set off with amazing swiftness; they leap over obstacles with as much agility as a buck; and, if the rider happens to fall, they are so manageable, that they stand stock still in the midst of their most rapid career. The Arabian horses are of a middle size, easy in their motions, and rather inclined to leanness than fat. They are regularly dressed every morning and evening, and with such care, that the smallest roughness is not left upon their skins. They wash the legs, the mane, and the tail, which they never cut; and which they seldom comb, lest they should thin the hair. They give them nothing to eat during the day; they only give them to drink once or twice; and at sun-set they hang a bag to their heads, in which there is about half a bushel of clean barley. They continue eating the whole night, and the bag is again taken away the next morning. They are turned out to pasture in the beginning of March, when the grass is pretty high, and at which time the mares are given to the stallion. When the spring is past, they take them again from pasture, and they get neither grass nor hay during the rest of the year; barley is their only food, except now and then a little straw. The mane of the foal is always clipped off when about a year
or

or eighteen months old, in order to make it stronger and thicker. They begin to break them at two years old, or two years and an half at farthest; they never saddle or bridle them till at that age; and then they are always kept ready saddled at the door of the tent, from morning till sun-set, in order to be prepared against any surprize. They at present seem sensible of the great advantage their horses are to the country; there is a law, therefore, that prohibits the exportation of the mares, and such stallions as are brought into England are generally purchased on the eastern shores of Africa, and come round to us by the Cape of Good Hope. They are in general less in stature than our own, being not above fourteen, or fourteen hands and an half high; their motions are much more graceful and swifter than of our own horses; but, nevertheless, their speed is far from being equal; they run higher from the ground; their stroke is not so long and close; and they are far inferior in bottom. Still, however, they must be considered as the first and finest breed in the world; and that from which all others have derived their principal qualifications. It is even probable that Arabia is the original country of horses; since there, instead of crossing the breed,

they take every precaution to keep it entire. In other countries they must continually change the races, or their horses would soon degenerate ; but there the same blood has passed down through a long succession, without any diminution either of force or beauty.

The race of Arabian horses has spread itself into Barbary, among the Moors, and has even extended across that extensive continent to the western shores of Africa. Among the Negroes of Gambia and Senegal, the chiefs of the country are possessed of horses ; which, though little, are very beautiful, and extremely manageable. Instead of barley they are fed, in those countries, with maize, bruised and reduced into meal, and mixed up with milk when they design to fatten them. These are considered as next to the Arabian horses, both for swiftness and beauty ; but they are rather still smaller than the former. The Italians have a peculiar sport, in which horses of this breed run against each other. They have no riders, but saddles so formed as to flap against the horses' sides as they move, and thus to spur them forward. They are set to run in a kind of railed walk, about a mile long, out of which they never attempt to escape ; but, when they once set forward, they never stop, although the walk
from

from one end to the other is covered with a crowd of spectators, which opens and gives way as the horses approach. Our horses would scarcely, in this manner, face a crowd, and continue their speed, without a rider, through the midst of a multitude; and, indeed, it is a little surprizing how in such a place the horses find their own way. However, what our English horses may want in sagacity, they make up by their swiftness; and it has been found upon computation that their speed is nearly one fourth greater even carrying a rider than that of the swiftest Barb without one.

The Arabian breed has been diffused into Egypt as well as Barbary, and into Persia also; where, as we are told by Marcus Paulus, there are studs of ten thousand white mares all together, very fleet, and with the hoof so hard that shoeing is unnecessary. In these countries, they in general give their horses the same treatment that they give in Arabia, except that they litter them upon a bed of their own dung, dried in the sun, and then reduced to powder. When this, which is spread under the horse about five inches thick, is moistened, they dry it again, and spread it as before. The horses of these countries a good deal resemble each other. They are usually of a slender make; their legs fine,

bony, and far apart; a thin mane; a fine crest; a beautiful head; the ear small and well pointed; the shoulder thin; the side rounded, without any unsightly prominence; the croup is a little of the longest, and the tail is generally set high. The race of horses, however, is much degenerated in Numidia; the natives having been discouraged from keeping the breed up by the Turks, who seize upon all the good horses, without paying the owners the smallest gratuity for their care in bringing them up. The Tingitani-ans and Egyptians have now, therefore, the fame of rearing the finest horses, both for size and beauty. The smallest of these last are usually sixteen hands high; and all of them shaped, as they express it, with the elegance of an antelope.

Next to the barb, travellers generally rank the Spanish genette. These horses, like the former, are little, but extremely swift and beautiful. The head is something of the largest; the mane thick; the ears long, but well pointed; the eyes filled with fire; the shoulder thickish, and the breast full and large. The croup round and large; the legs beautiful, and without hair; the pastern a little of the longest, as in the Barb, and the hoof rather too high. Nevertheless, they move with great ease, and carry themselves

selves extremely well. Their most usual colour is black, or a dark bay. They seldom or never have white legs, or white snip. The Spaniards, who have a groundless aversion to these marks, never breed from such as have them. They are all branded on the buttock with the owner's name; and those of the province of Andalusia pass for the best. These are said to possess courage, obedience, grace, and spirit, in a greater degree than even the Barb; and, for this reason, they have been preferred as war horses to those of any other country.

The Italian horses were once more beautiful than they are at present, for they have greatly neglected the breed. Nevertheless, there are still found some beautiful horses among them, particularly among the Neapolitans, who chiefly use them for the draught. In general they have large heads and thick necks. They are also restiff, and consequently unmanageable. These faults, however, are recompensed by the largeness of their size, by their spirit, and the beauty of their motion. They are excellent for shew, and have a particular aptitude to prance.

The Danish horses are of such an excellent size and so strong a make, that they are preferred to all others for the draught.
There

There are some of them perfectly well shaped; but this is but seldom seen, for in general they are found to have a thick neck, heavy shoulders, long and hollow back, and a narrow croup: however, they all move well, and are found excellent both for parade and war. They are of all colours, and often of whimsical ones, some being streaked like the tyger, or mottled like the leopard.

The German horses are originally from Arabian and Barbary stocks; nevertheless, they appear to be small and ill shaped: it is said also, that they are weak and washy, with tender hoofs. The Hungarian horses, on the other hand, are excellent for the draught, as well as the saddle. The Hussars, who use them in war, usually slit their nostrils; which is done, as it is said, to prevent their neighing, but, perhaps, without any real foundation.

The Dutch breed is good for the draught, and is generally used for that purpose over Europe: the best come from the province of Friezland. The Flanders horses are much inferior to the former; they have most commonly large heads, flat feet, and swollen legs; which are an essential blemish in horses of this kind.

The French horses are of various kinds; but they have few that are good. The best
horses

horses of that country come from Limosin; they have a strong resemblance to the Barb, and, like them, are excellent for the chace; but they are slow in coming to perfection: they are to be carefully treated while young, and must not be backed till they are eight years old. Normandy furnishes the next best; which, though not so good for the chace, are yet better for war. In general, the French horses have the fault of being heavy shouldered, which is opposite to the fault of the Barb, which is too thin in the shoulder, and is, consequently, apt to be shoulder-slipt.

Having mentioned the horses most usually known in Europe, we pass on to those of more distant countries, of whose horses we can only judge by report. We mentioned the wild horses of America. Such as are tame, if we may credit the latest reports, * are admirable. Great numbers of these are bred up to the chace, and are chiefly kept for this purpose, particularly at Quito. The hunters, as Ulloa informs us, are divided into two classes; one part on foot, the other on horseback: the business of the footmen is to rouse the deer; and that of the horsemen, to hunt it down. They all, at break of day, repair to the place appointed, which is generally on the summit

* Ulloa's Voyage, vol. i. p. 461.

summit of an hill, with every man his greyhound. The horsemen place themselves on the highest peaks ; whilst those on foot range the precipices, making an hideous noise, in order to start the deer. Thus the company extend themselves three or four leagues, or more, according to their numbers. On starting any game, the horse which first perceives it, sets off, and the rider, being unable to guide or stop him, pursues the chace, sometimes down such a steep slope, that a man on foot, with the greatest care, could hardly keep his legs ; from thence he flies up a dangerous ascent, or along the side of a mountain, so that a person, not used to this exercise, would think it much safer to throw himself out of the saddle, than commit his life to the precipitate ardor of his horse. The other horses, which join in the chace, do not wait for the riders to animate them ; they set forward immediately upon seeing another at full speed ; and it becomes prudence in the rider to give them their way, and at the same time to let them feel the spur, to carry him over the precipices. These horses are backed and exercised to this method of hunting ; and their usual pace is trotting.

There are said to be very good horses in the islands of the Archipelago. Those of
Crete

Crete were in great reputation among the ancients, for their swiftness and force; however, at present they are but little used, even in the country itself, because of the unevenness of the ground, which is there very rocky and mountainous. The original horses of Morocco are much smaller than the Arabian breed; however, they are very swift and vigorous. In Turkey there are to be found horses of almost all races: Arabians, Tartars, Hungarians, and those natural to the place. The latter are very beautiful and elegant; they have a great deal of fire, swiftness, and management; but they are not able to support fatigue: they eat little; they are easily heated; and they have skins so sensible, that they can scarcely bear the rubbing of the stirrup. The Persian horses are, in general, the most beautiful and most valuable of all the east. The pastures in the plains of Media, Persepolis, Ardebil, and Derbent, are excellent for the purpose of rearing them; and there were bred in those places vast numbers, by order of the government of Persia, while that country was under any government. Pietro della Valle prefers the horses of Persia to those of Italy; and informs us, that they are in general of a middle size; and although some are found even of the smallest stature, yet that does not impair their

their beauty nor their strength : yet, in some places, they are found of a very good size, and as large as the English saddle-horses are generally found to be: they have all a thin head, a fine crest, a narrow breast, small ears well placed, the legs fine, the hoof hard, and the croup beautiful; they are docile, spirited, nimble, hardy, courageous, and capable of supporting a very great fatigue; they run very swiftly, without being easily fatigued; they are strong, and easily nourished, being only supplied with barley and chopped straw; they are put to graze only for six weeks in the spring; they have always the tail at full length, and there is no such thing as geldings among the number; they are defended from the air, as in England, by body-cloaths; they attend them with the most punctual exactness; and they are rid generally in a snaffle, without spurs. Great numbers of these are every year transported into Turkey, but chiefly into the East-Indies: however, after all, travellers agree that they are not to be compared to the Arabian horses, either for courage, force, or beauty; and that the latter are greatly sought, even in Persia.

The horses of India are of a very indifferent kind, being weak and washy. Those which are used by the grandees of the country, come from Persia and Arabia; they

they are fed with a small quantity of hay during the day; and at night they have boiled peas, mixed with sugar and butter, instead of oats or barley: this nourishment supports them, and gives them strength; otherwise, they would soon sink and degenerate, the heat of the climate being against them. Those naturally belonging to the country, are very small and vicious. Some are so very little, that Taverner reports, that the young Mogul prince, at the age of seven or eight, rode one of those little horses, that was not much larger than a greyhound: and it is not long since one of these was brought over into this country, as a present to our Queen, that measures no more than nine hands high; and is not much larger than a common mastiff. It would seem, that climates excessively hot, are unfavourable to this animal. In this manner, the horses of the Gold coast, and of Guinea, are extremely little, but very manageable. It is a common exercise with the grandees of that country, who are excellent horsemen, to dart out their lances before them upon full gallop, and to catch them again before they come to the ground. They have a sport also on horseback, that requires great dexterity in the rider, and a great share of activity in the horse; they strike off a ball, with a battledore, while they

they are upon a full gallop, and pursuing it, strike it again before it comes to the ground ; and this they continue for a mile together, striking sometimes to the right, and sometimes to the left, with amazing speed and agility.

The horses of China are as indifferent as those of India : they are weak, little, ill-shaped, and cowardly. Those of Corea are not above three feet high : almost all the breed there are made geldings, and are so timorous, that they can be rendered no way serviceable in war ; so that it may be said, that the Tartar horses were properly the conquerors of China. These, indeed, are very serviceable in war ; and although but of a middle size, yet they are surprisingly patient, vigorous, swift, and bold ; their hoofs are extremely hard, though rather too narrow ; their heads are fine, but rather too little ; the neck is long and stiff ; the legs of the longest ; and yet, with all these faults, they are found to be an excellent breed. The Tartars live with their horses pretty much in the same manner as the Arabians do ; they begin to back them at the age of seven or eight months, placing their children upon them, who manage them, even at that early age. By this means they break them, by little and little, till at last about the age of
fix

six or seven years, they are capable of enduring amazing hardships. Thus they have been known to march two or three days without once stopping, to continue five or six, without eating any thing except an handful of grafs at every eight hours ; and, besides, to remain without drinking, for four and twenty hours. These horses, which are so vigorous in their own country, lose all their strength when they are brought into China or the Indies ; but they thrive pretty well in Persia and Turkey. The race of little Tartars towards the north, have also a breed of little horses, which they set such a value upon, that it is forbidden to sell them to strangers : these horses have the very same qualities with those of the larger kind ; which they probably derive from a similar treatment. There are also several very fine horses in Circassia and Mingrelia. There are some greatly esteemed in the Ukraine, in Walachia, Poland, and Sweden ; but we have no particular accounts of their excellencies or defects.

If we consult the ancients on the nature and qualities of the horses of different countries, we learn, that the Grecian horses, and particularly those of Theffaly, had the reputation of being excellent for war ; that those of Achaia were the largest that were known ; that the most beautiful came
from

from Egypt, which bred great numbers ; that the horses of Ethiopia were not in esteem from the heat of the country ; that Arabia and Africa furnished very beautiful horses, and very fit for the course ; that those of Italy, and particularly of Apulia, were very good ; that in Sicily, Capadocia, Syria, Armenia, Media, and Persia, there were excellent horses, equally esteemed for their speed and vigour ; that those of Sardinia and Corsica, though small, were spirited and courageous ; that those of Spain resembled the Parthian horses, in being very well adapted for war ; that in Walachia and Transylvania, there were horses with bushy tails, and manes hanging down to the ground, which, nevertheless, were extremely swift and active ; that the Danish horses were good leapers ; those of Scandinavia, though little, were well shaped, and possessed of great agility ; that the Flanders breed was strong ; that the Gaulish horses were good for carrying burthens ; that the German breeds were so bad, so diminutive, and ill shaped, that no use could be made of them ; that the Swiss and Hungarian horses were good ; and, lastly, that those of India were very diminutive and feeble.

Such are the different accounts we have of the various races of horses in different parts

parts of the world. I have hitherto omitted making mention of one particular breed, more excellent than any that either the ancients or moderns have produced ; and that is our own. It is not without great assiduity, and unceasing application, that the English horses are now become superior to those of any other part of the world, both for size, strength, swiftness, and beauty. It was not without great attention, and repeated trials of all the best horses in different parts of the world, that we have been thus successful in improving the breed of this animal ; so that the English horses are now capable of performing what no others ever could attain to. By a judicious mixture of the several kinds, by the happy difference of our soils, and by our superior skill in management, we have brought this animal to its highest perfection. An English horse, therefore, is now known to excel the Arabian, in size and swiftness ; to be more durable than the Barb, and more hardy than the Persian. An ordinary racer is known to go at the rate of a mile in two minutes : and we had one instance, in the admirable Childers, of still greater rapidity. He has been frequently known to move above eighty-two

two feet and an half in a second, or almost a mile in a minute: he has run also round the course of Newmarket, which is very little less than four miles, in six minutes and forty seconds. But what is surprizing, no other horse has been since found, that ever could equal him: and those of his breed have been remarkably deficient.

However this be, no horses can any way equal our own, either in point of swiftness or strength; and these are the qualifications our horsemen seem chiefly to value. For this reason, when the French, or other foreigners, describe our breed, they all mention, as a fault, the aukward and ungainly motion of our horses; they allow them to be very good indeed, but they will not grant them an easy or an elegant carriage. * But these writers do not consider that this seeming want of grace is entirely the result of our manner of breaking them. We consult only speed and dispatch in this animal's motions: the French, and other nations, are more anxious for parade and spirit. For this reason we always throw our horses forward, while they put them upon their haunches; we give them an easy swift gait of going

* See Buffon's Account of our Horses.

going, that covers a great deal of ground: they, on the contrary, throw them back, giving them a more shewy appearance indeed, but one infinitely less useful. The fault of our manner of breaking is, that the horse is sometimes apt to fall forward; the French managed horse never falls before, but more usually on one side; and for this reason, the rider wears stiff boots, to guard his legs against such accidents. However, it would be a very easy matter to give our horses all that grace which foreigners are so fond of; but it would certainly take from their swiftness and durability.

But in what degree of contempt soever foreigners might formerly have held our horses, they have for some time perceived their error, and our English hunters are considered as the noblest and the most useful horses in the world. Our geldings are, therefore, sent over to the continent in great numbers, and sell at very great prices; as for our mares and stallions, there is a law prohibiting their exportation; and one similar to this, obtained even as early as the times of Athelstan, who prohibited their exportation, except where designed as presents.

Roger de Belegme, created earl of Shrewsbury
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bury by William the Conqueror, * is the first who is recorded to have made attempts towards the mending our native breed. He introduced Spanish stallions into his estate at Powisland in Wales, from which that part of the country was for many ages after famous for a swift and generous race of horses: however, at that time, strength and swiftness were more regarded than beauty; the horses shapes, in time of action, being entirely hid by a coat of armour, which the knights then usually put upon them, either by way of ornament or defence.

The number of our horses, in London alone, in the time of king Stephen, is said to have amounted to twenty thousand. However, long after, in the times of queen Elizabeth, the whole kingdom could not supply two thousand horses to form our cavalry. At present, the former numbers seem revived; so that, in the late war, we furnished out above thirteen thousand horsemen: and could, if hard pushed, supply above four times that number. How far this great increase of horses among us may be beneficial, or otherwise, is not the proper business of the present page to discuss; but certain

* British Zoology, vol. i. p. 4. To this work I am indebted for several particulars with regard to the native animals of this island.

certain it is, that where horses encrease in too great a degree, men must diminish proportionably ; as that food which goes to supply the one, might very easily be converted into nourishment to serve the other. But, perhaps, it may be speculating too remotely, to argue for the diminution of their numbers upon this principle, since every manufacture we export into other countries, takes up room, and may have occupied that place, which, in a state of greater simplicity, might have given birth and subsistence to mankind, and have added to population.

Be this as it will, as we have been at such expence and trouble to procure an excellent breed of horses, it is not now to be expected that we should decline the advantages arising from it, just when in our possession. It may be, therefore, the most prudent measure in our legislature, to encourage the breed, as an useful branch of commerce, and a natural defence to the country. But how far this end is answered by the breeding up of racers, is what most persons, versed in this subject, are very apt to question. They assert, that the running-horse, as the breed has been for a long time refined, is unfit for any other service than that of the course, being too slight either

for the road, the chace, or the combat; and his joints so delicately united, as to render him subject to the smallest accidents. They, therefore, conclude, that less encouragement given to racing, would be a means of turning us from breeding rather for swiftness than strength; and that we should thus be again famous for our strong hunters, which they say are wearing out from among us.

How far this may be fact, I will not take upon me to determine, being but little versed in a subject that does not properly come within the compass of natural history. Instead, therefore, of farther expatiating on this well known animal's qualifications, upon which many volumes might easily be written, I will content myself with just mentioning the description of Camerarius, in which he professes to unite all the perfections which an horse ought to be possessed of. "It must," says he, "have three parts, like those of a woman; the breast must be broad, the hips round, and the mane long: it must, in three things resemble a lion; its countenance must be fierce, its courage must be great, and its fury irresistible: it must have three things belonging to the sheep; the nose, gentleness, and patience: it must have three of a deer; head, leg, and skin: it must have

have three of a wolf; throat, neck, and hearing: it must have three of a fox; ear, tail, and trot: three of a serpent; memory, fight, and flexibility: and, lastly, three of an hare; running, walking, and perseverance."



C H A P. XVI.

Of the Afs.*

ALTHOUGH this animal is very easily distinguished from the horse at first sight, yet, upon a closer inspection, the similitude between them is very striking. They have both a similar outline in the external parts; the same conformation within. One would be led, from the great resemblance there is between them, to suppose them of the same species; and that the afs was only an horse degenerated: however, they are perfectly distinct, and there is an inseparable line drawn between them, for the mule they produce is barren. This seems to be the barrier between every species of animals; this keeps them asunder, and preserves the unities of their form. If the mule, or the monster bred between two animals, whose form nearly approaches, is no longer fertile, we may then conclude, that these animals, however resembling, are of different kinds.—Nature has providently stopped the fruitfulness of these ill-formed productions, in order to preserve

* Many parts of this account are extracted from Daubenton and Buffon; which I mention here, to avoid troubling the reader with a multiplicity of quotations.

serve the form of every animal uncontaminated: were it not for this, the races would quickly be mixed with each other; no one kind would preserve its original perfection; every creature would quickly degenerate; and the world would be stocked with imperfection and deformity.

The horse and the ass, therefore, though so nearly approaching in form, are of two distinct kinds, different in their nature; and were there but one of each kind, both races would then be extinguished. Their shapes and their habits may, indeed, be very nearly alike; but there is something in every animal, beside its conformation or way of life, that determines its specific nature. Thus there is much greater resemblance between the horse and the ass, than between the sheep and the goat; and yet the latter produce an animal that is by no means barren, but which quickly reproduces an offspring resembling the sheep; while the mule of the former is marked with certain sterility. The goat and the sheep may be therefore said to be of one kind, although so much unlike in figure; while the horse and the ass are perfectly distinct, though so closely resembling. It has, indeed, been said by Aristotle, that their male is sometimes prolific; this, however, has not

not been confirmed by any other testimony, although there has elapsed a period of near two thousand years to collect the evidence.

But what tends to put the subject out of dispute is, that the two animals are found in a state of nature, entirely different. The onager, or wild ass, is seen in still greater abundance than the wild horse; and the peculiarities of its kind are more distinctly marked than in those of the tame one. Had it been an horse degenerated, the likeness would be stronger between them, the higher we went to the original stock from whence both have been supposed to be sprung. The wild animals of both kind, would, in such a case, resemble each other, much more than those of the tame kind, upon whom art has, for a succession of ages, been exercising all its force, and producing strange habits and new alterations. The contrary however obtains, and the wild ass is even more asinine, if I may so express it, than that bred in a state of domestic servitude; and has even a natural aversion to the horse, as the reader will shortly learn.

The wild ass has, by some writers, been confounded with the zebra, but very improperly, for they are of a very different species. The wild ass is not streaked like the

the zebra, nor is his shape so beautiful : his figure is pretty much the same as that of the common ass, except that he is of a brighter colour, and has a white list running from his head to his tail. This animal is found wild in many islands of the Archipelago, particularly in that of Cerigo. There are many wild asses in the deserts of Lybia and Numidia, that run with such amazing swiftness, that scarce even the coursers of the country can overtake them. When they see a man, they set up an horrid braying, and stop short all together, till he approaches near them; they then, as if by common consent, fly off with great speed; and it is upon such occasions that they generally fall into the traps which are previously prepared to catch them. The natives take them chiefly upon account of their flesh, which they esteem as delicious eating; and for their skins, of which that kind of leather is made which is called shagreen.

Olearius relates that the monarch of Persia invited him on a certain day to be present at an entertainment of a very peculiar nature, which was exhibited in a small building near the palace, resembling a theatre. After a collation of fruits and sweetmeats, more than thirty of these wild asses were driven into the area, among which the monarch discharged

discharged several shot, and some arrows, and in which he was imitated by some of the rest of his attendants. The asses, finding themselves wounded, and no way of escaping, instantly began to attack each other, biting with great fierceness, and braying terribly. In this manner they continued their mutual animosity, while the arrows were poured in from above, until they were all killed; upon which they were ordered to be taken, and sent to the king's kitchen at Ispahan. The Persians esteem the flesh of this animal so highly, that its delicacy is even become a proverb among them. What may be the taste of the wild asses flesh, we are unable to say; but certain it is, that the flesh of the tame ass is the worst that can be obtained, being dryer, more tough and more disagreeable than even horse-flesh. Galen even says that it is very unwholesome. Yet we should not judge hastily upon the different tastes of different people, in the preference they give to certain meats. The climate produces very great changes in the tenderness and the flavour of several viands: that beef, for instance, which is so juicy and good in England, is extremely tough and dry when killed under the line; on the contrary, that pork which is with us so unpalatable in summer, in the warmer latitudes, where it

it is always hotter than here, is the finest eating they have, and much preferable to any hog's flesh in Europe.

The afs, like the horse, was originally imported into America by the Spaniards, and afterwards by other nations. That country seems to have been peculiarly favourable to this race of animals; and, where they have run wild, they have multiplied in such numbers, that in some places they are become a nuisance.* In the kingdom of Quito, the owners of the grounds where they are bred, suffer all persons to take away as many as they can, on paying a small acknowledgment, in proportion to the number of days their sport lasts. They catch them in the following manner. A number of persons go on horseback, and are attended by Indians on foot: when arrived at the proper places, they form a circle in order to drive them into some valley; where, at full speed, they throw the noose, and endeavour to halter them. Those creatures, finding themselves inclosed, make very furious efforts to escape; and, if only one forces his way through, they all follow with an irresistible impetuosity. However, when noosed, the hunters throw them down and secure them with fetters, and thus leave them

* Ulloa, vol. i. p. 316.

them till the chace is over. Then, in order to bring them away with greater facility, they pair them with tame beasts of the same kind; but this is not easily performed, for they are so remarkably fierce that they often hurt the persons who undertake to manage them. They have all the swiftness of horses, and neither declivities nor precipices can retard their career. When attacked, they defend themselves with their heels and mouth with such activity, that, without slackening their pace, they often maim their pursuers. But the most remarkable property in these creatures is, that after carrying their first load, their celerity leaves them, their dangerous ferocity is lost, and they soon contract the stupid look and dullness peculiar to the asinine species. It is also observable, that these creatures will not permit an horse to live among them. They always feed together; and, if an horse happens to stray into the place where they graze, they all fall upon him; and, without giving him the liberty of flying, they bite and kick him till they leave him dead upon the spot.

Such is this animal in its natural state, swift, fierce, and formidable; but, in his state of tameness, the ass presents a very different picture; the moment his native liberty is repressed,
he

he seems entirely to give up all claims to freedom ; and he assumes a patience and submission even humbler than his situation. He is, in a state of tameness, the most gentle and quiet of all animals. He suffers with constancy, and, perhaps, with courage, all the ill treatment that cruelty and caprice are pleased to inflict. He is temperate with regard to the quantity and the quality of his provision. He is contented with the most neglected weeds ; and makes his humble repast upon what the horse and other animals leave behind. If he gives the preference to any vegetable, it is to the plantane ; for which he is often seen to neglect every other herb in the pasture : but he is chiefly delicate with respect to his water ; he drinks only at the clearest brooks, and chiefly those to which he has been accustomed. He drinks as soberly as he eats ; and never, like the horse, dips his nose into the stream. As he is seldom saddled, he frequently rolls himself upon the grass ; and lies down, for this purpose, as often as he has an opportunity, without minding what becomes of his burthen. He never rolls, like the horse, in the mud ; he even fears to wet his feet ; and turns out of his way to avoid the dirty parts of a road.

When

When very young, the afs is sprightly, and even tolerably handsome ; but he soon lofes these qualifications, either by age or bad treatment, and he becomes flow, stupid, and headstrong. He seems to shew no ardour, except for the female, having been often known to die after the covering. The she-afs is not less fond of her young than the male is of her ; and we are assured that she will cross fire and water to protect, or rejoin it. This animal is sometimes not less attached to its owner ; by whom he is too often abused. He scents him at a distance, and distinguishes him from others in a crowd ; he knows the ways he has passed, and the places where he inhabits.

When over-loaded, the afs shews the injustice of his master, by hanging down his head and lowering his ears ; when he is too hard pressed, he opens his mouth and draws back his lips in a very disagreeable manner. If his eyes are covered, he will not stir a step ; and, if he is laid down in such a manner that one eye is covered with the grass while the other is hidden with a stone, or whatever is next at hand, he will continue fixed in the same situation, and will not so much as attempt to rise to free himself from those slight impediments. He walks, trots, and gallops like an horse ;
but,

but, although he sets out very freely at first, yet he is soon tired; and then no beating will make him mend his pace. It is in vain that his unmerciful rider exerts his whip or his cudgel; the poor little animal bears it all with patience, and without a groan; and, conscious of his own imbecility, does not offer even to move.

Notwithstanding the stupid heaviness of his air, he may be educated with as much ease as any other animal, and several have been brought up to perform, and exhibited as a shew. In general, however, the poor animal is entirely neglected. Man despises this humble useful creature, whose efforts are exerted to please him, and whose services are too cheaply purchased. The horse is the only favourite, and upon him alone all expence and labour are bestowed. He is fed, attended, and stabled, while the ass is abandoned to the cruelty of the lowest rustics, or even to the sport of children, and, instead of gaining by the lessons he receives, is always a loser. He is conducted along by blows; he is insulted by unnecessary stripes; he is overloaded by the lazy; and, being generally the property of the poor, he shares with them in their wants and their distresses. Thus this faithful animal, which, were there no horses,

horses, would be the first of the quadrupede kind in our esteem, is now considered as nothing ; his properties and qualifications being found in an higher degree elsewhere, he is entirely disregarded ; and, from being the second, he is degraded into one of the most useless of the domestic quadrupedes.

For this reason, very little care has been taken to improve the breed ; it is suffered to degenerate ; and it is probable, that of all other animals this alone is rendered feeblér and more diminutive, by being in a state of domestic servitude. The horse, the cow, and the sheep, are rendered larger by the assiduity of man ; the ass is suffered to dwindle every generation, and particularly in England, where it is probable that, but for the medicinal qualities of its milk, the whole species would have ere now been extinguished. Nevertheless, we have good reasons to believe that, were the same care bestowed on the ass that is spent upon the horse, were the same industry used in crossing the breed and improving it, we should see the ass become from his present mean state, a very portly and serviceable animal ; we should find him rival the horse in some of his perfections, and exceed him in others. The ass, bulk for bulk, is stronger than the horse ; he is more sure footed also ;

also; and, though more slow in his motions, he is much less apt to start out of the way.

The Spaniards, of all people in Europe, seem alone to be acquainted with the value of the ass. They take all proper precautions to improve the breed; and I have seen a jack-ass, from that country, above fifteen hands high. This animal, however, seems originally a native of Arabia. A warm climate is known to produce the largest and the best; their size and spirit decline in proportion as they advance into colder regions.

Though now so common in all parts of England, the ass was entirely lost amongst us during the reign of Queen Elizabeth. Holingshed informs us that our land did yield no asses.* However, there are accounts of their being common in England before that time. In Sweden, they are at present a sort of rarity; nor does it appear by the last history of Norway that they have yet reached that country. It is in the hotter climates alone that we are to look for the original of this serviceable creature. In Guinea, they are larger and more beautiful than even the horses of the same country. In Persia, they have two kinds; one of

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* British Zoology, vol. i. p. 11.

which is used for burthens, being slow and heavy; the other, which is kept for the saddle, being smooth, stately, and nimble. They are managed as horses, only that the rider sits nearer the crupper, and they are taught to amble like them. They generally cleave their nostrils to give them more room for breathing, and many of these are sold for forty or fifty pounds.

The ass is a much more healthy animal than the horse, and liable to fewer diseases. Of all animals covered with hair, he is the least subject to vermin, for he has no lice, probably owing to the dryness and the hardness of his skin. Like the horse, he is three or four years in coming to perfection; he lives till twenty or twenty-five; sleeps much less than the horse; and never lies down for that purpose, unless very much tired. The she-ass goes above eleven months with young, and never brings forth more than one at a time. The mule may be engendered either between an horse or a she-ass, or between a jack-ass and a mare. The latter breed is every way preferable, being larger, stronger, and better shaped. It is not yet well known whether the animal called the Gimmerro be one of these kinds; or, as is asserted, bred between the ass and the

the bull. While naturalists affirm the impossibility of this mixture, the natives of the Alpine countries, where this animal is bred, as strongly insist upon its reality. The common mule is very healthy, and will live above thirty years, being found very serviceable in carrying burthens, particularly in mountainous and stony places, where horses are not so sure footed. The size and strength of our asses is at present greatly improved by the importation of Spanish jack-asses; and it is probable we may come in time to equal the Spaniards in breeding them, where it is not uncommon to give fifty or sixty guineas for a mule; and, indeed, in some mountainous countries, the inhabitants cannot well do without them. Their manner of going down the precipices of the Alps, or the Andes, is very extraordinary; and with it we will conclude their history. In these passages, on one side, are steep eminences, and, on the other, frightful abysses; and, as they generally follow the direction of the mountain, the road, instead of lying in a level, forms at every little distance steep declivities, of several hundred yards downward. These can only be descended by mules; and the animal itself seems sensible of the danger, and the caution that is to be used in such descents.

When they come to the edge of one of these descents, they stop of themselves, without being checked by the rider; and, if he inadvertently attempts to spur them on, they continue immoveable. They seem all this time ruminating on the danger that lies before them, and preparing themselves for the encounter. They not only attentively view the road, but tremble and snort at the danger. Having prepared for the descent, they place their fore-feet in a posture, as if they were stopping themselves; they then also put their hinder feet together, but a little forward, as if they were going to lie down. In this attitude, having taken as it were a survey of the road, they slide down with the swiftness of a meteor. In the mean time, all the rider has to do is to keep himself fast on the saddle, without checking the rein, for the least motion is sufficient to disorder the equilibrium of the mule; in which case they both unavoidably perish. But their address, in this rapid descent, is truly wonderful; for, in their swiftest motion, when they seem to have lost all government of themselves, they follow exactly the different windings of the road, as if they had previously settled in their minds the route they

they were to follow, and taken every precaution for their safety. In this journey, the natives, who are placed along the sides of the mountains, and hold by the roots of the trees, animate the beasts with shouts, and encourage them to perseverance. Some mules, after being long used to these journeys, acquire a kind of reputation for their safety and skill; and their value rises in proportion to their fame. *

* Ulloa, vol. i.



C H A P. XVII.

Of the Zebra.

TH E R E are but three animals of the horse kind. The horse, which is the most stately and courageous; the ass, which is the most patient and humble; and the zebra, which is the most beautiful, but at the same time the wildest animal in nature. Nothing can exceed the delicate regularity of this creature's colour, or the lustrous smoothness of its skin; but, on the other hand, nothing can be more timid or more untameable.

It is chiefly a native of the southern parts of Africa; and there are whole herds of them often seen feeding in those extensive plains that lie towards the Cape of Good Hope. However, their watchfulness is such, that they will suffer nothing to come near them; and their swiftness so great, that they readily leave every pursuer far behind. The zebra, in shape, rather resembles the mule, than the horse, or the ass. It is rather less than the former, and yet larger than the latter. Its ears are not so long as those of the ass, and yet not so small as in the horse kind. Like the ass, its head is large, its back
straight,

straight, its legs finely placed, and its tail tufted at the end; like the horse, its skin is smooth and close, and its hind quarters round and fleshy. But its greatest beauty lies in the amazing regularity and elegance of its colours. In the male, they are white and brown; in the female, white and black. These colours are disposed in alternate stripes over the whole body, and with such exactness and symmetry, that one would think Nature had employed the rule and compass to paint them. These stripes, which, like so many ribbands, are laid all over its body, are narrow, parallel, and exactly separated from each other. It is not here as in other party coloured animals, where the tints are blended into each other; every stripe here is perfectly distinct, and preserves its colour round the body, or the limb, without any diminution. In this manner are the head, the body, the thighs, the legs, and even the tail and the ears beautifully streaked, so that at a little distance one would be apt to suppose that the animal was dressed out by art, and not thus admirably adorned by nature.

In the male Zebra, the head is striped with fine bands of black and white, which in a manner center in the forehead. The ears are variegated with a white and dusky brown.

brown. The neck has broad stripes of the same dark brown, running round it, leaving narrow white stripes between. The body is striped also across the back with broad bands, leaving narrower spaces of white between them, and ending in points at the sides of the belly, which is white, except a black line pectinated on each side, reaching from between the fore-legs, along the middle of the belly, two thirds of its length. There is a line of separation between the trunk of the body and the hinder quarters, on each side; behind which, on the rump, is a plat of narrow stripes, joined together, by a stripe down the middle, to the end of the tail. The colours are different in the female; and in none the stripes seem entirely to agree in form, but in all they are equally distinct; the hair equally smooth and fine; the white shining and unmixed; and the black, or brown, thick and lustrous.

Such is the beauty of this creature, that it seems by nature fitted to satisfy the pride and the pleasure of man; and formed to be taken into his service. Hitherto, however, it appears to have disdained servitude, and neither force nor kindness have been able to wean it from its native independence and ferocity. But this wildness might, per-

haps, in time, be surmounted; and it is probable, the horse and the ass, when first taken from the forest, were equally obstinate, fierce, and unmanageable. Mr. Buffon informs us, that the Zebra, from which he took his description, could never be entirely mastered, notwithstanding all the efforts which were tried to tame it. They continued, indeed to mount it, but then with such precautions as evidently shewed its fierceness, for two men were obliged to hold the reins, while the third ventured upon its back; and even then it attempted to kick whenever it perceived any person approaching. That which is now in the Queen's menagerie, at Buckingham-Gate, is even more vicious than the former; and the keeper who shews it takes care to inform the spectators of its ungovernable nature. Upon my attempting to approach, it seemed quite terrified, and was preparing to kick, appearing as wild as if just caught, although taken extremely young, and used with the utmost indulgence. Yet still it is most probable that this animal, by time and assiduity, could be brought under subjection. As it resembles the horse in form, without all doubt it has a similitude of nature, and only requires the efforts of an industrious and skilful nation, to be added to

to the number of our domestics. It is not now known what were the pains and the dangers which were first undergone to reclaim the breed of horses from savage ferocity; these, no doubt, made an equal opposition; but, by being opposed, by an industrious and enterprising race of mankind, their spirit was at last subdued, and their freedom restrained. It is otherwise with regard to the Zebra; it is the native of countries where the human inhabitants are but little raised above the quadrupede. The natives of Angola, or Caffraria, have no other idea of advantage from horses, but as they are good for food; neither the fine stature of the Arabian courser, nor the delicate colourings of the Zebra, have any allurements to a race of people, who only consider the quantity of flesh, and not its conformation. The delicacy of the Zebra's shape, or the painted elegance of its form, are no more regarded by such, than by the lion that makes it his prey. For this reason, therefore, the Zebra may hitherto have continued wild, because it is the native of a country where there have been no successive efforts made to reclaim it. All pursuits that have been hitherto instituted against it, were rather against its life than its liberty; the animal has thus been long taught to consider man as its most mortal enemy; and
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it is not to be wondered that it refuses to yield obedience where it has so seldom experienced mercy. There is a kind of knowledge in all animals, that I have often considered with amazement ; which is, that they seem perfectly to know their enemies, and to avoid them. Instinct, indeed, may teach the deer to fly from the lion ; or the mouse to avoid the cat : but what is the principle that teaches the dog to attack the dog-butcher wherever he sees him ? In China, where the killing and dressing dogs is a trade, whenever one of these people move out, all the dogs of the village, or the street, are sure to be after him. This I should hardly have believed, but that I have seen more than one instance of it among ourselves. I have seen a poor fellow who made a practice of stealing and killing dogs for their skins, pursued hue and cry for three or four streets together, by all the bolder breed of dogs, while the weaker flew from his presence with affright. How these animals could thus find out their enemy, and pursue him, appears I own unaccountable, but such is the fact ; and it not only obtains in dogs, but in several other animals, though perhaps to a less degree. This very probably may have been, in some measure, a cause that has
hitherto

hitherto kept the zebra in its state of natural wildness ; and in which it may continue, till kinder treatment shall have reconciled it to its pursuers.

It is very likely, therefore, as a more civilized people are now placed at the Cape of Good Hope, which is the chief place where this animal is found, that we may have them tamed and rendered serviceable. Nor is its extraordinary beauty the only motive we have for wishing this animal among the number of our dependents : its swiftness is said to surpass that of all others ; so that the speed of a zebra is become a proverb among the Spaniards and Portuguese. It stands better upon its legs also than an horse ; and is consequently stronger in proportion. Thus, if by proper care we improved the breed, as we have in other instances, we should probably in time to come have a race as large as the horse, as fleet, as strong, and much more beautiful.

The zebra, as was said, is chiefly a native of the Cape of Good Hope. It is also found in the kingdom of Angola ; and, as we are assured by Lopez, in several provinces also of Barbary. In those boundless forests it has nothing to restrain its liberty ; it is too shy to be caught in traps, and therefore seldom taken alive. It would seem,

seem, therefore, that none of them have ever been brought into Europe, that were caught sufficiently young, so as to be un-
 tintured by their original state of wild-
 ness. The Portuguese, indeed, pretend
 that they have been able to tame them, and
 that they have sent four from Africa to
 Lisbon, which were so far brought under as
 to draw the king's coach; * they add, that
 the person who sent them over, had the
 office of notary conferred upon him for his
 reward, which was to remain to him and his
 posterity for ever: but I do not find this
 confirmed by any person who says he saw
 them. Of those which were sent to Brasil,
 not one could be tamed; they would per-
 mit one man only to approach them; they
 were tied up very short; and one of them,
 which had by some means got loose, actual-
 ly killed his groom, having bitten him to
 death †. Notwithstanding this, I believe,
 were the zebra taken up sufficiently young,
 and properly treated, it might be rendered as
 tame as any other animal; and Merolla,
 who saw many of them, asserts, that when
 tamed, which he speaks of as being com-
 mon enough, they are not less estimable
 for their swiftness than their beauty.

This

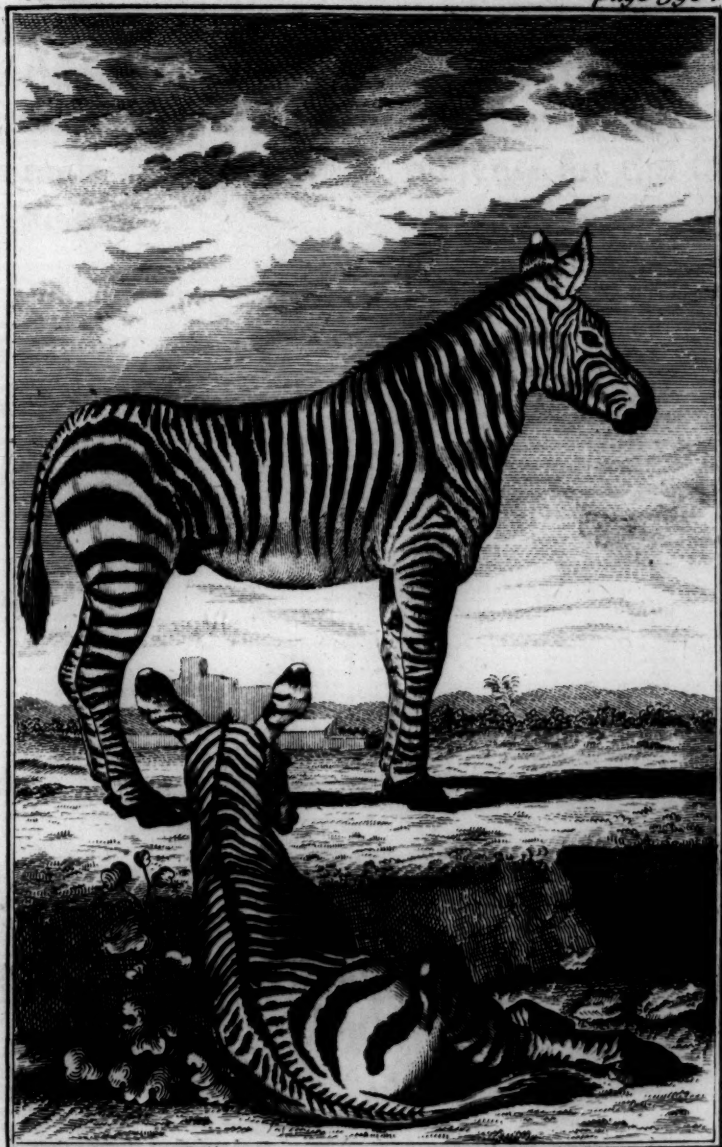
* Dapper.

† Pyrrard. tom. ii. p. 376.

This animal, which is neither to be found in Europe, Asia, or America, is nevertheless very easily fed. That which came over into England some years ago, would eat almost any thing, such as bread, meat, and tobacco; that which is now among us, subsists entirely upon hay. As it so nearly resembles the horse and the ass in structure, so it probably brings forth annually as they do. The noise they make is neither like that of an horse or an ass, but more resembling the confused barking of a mastiff dog. In the two which I saw, there was a circumstance that seems to have escaped naturalists; which is, that the skin hangs loose below the jaw upon the neck, in a kind of dewlap, which takes away much from the general beauty. But whether this be a natural or accidental blemish, I will not take upon me to determine.

These animals are often sent as presents to the princes of the east. We are told, that one of the governors of Batavia gave a zebra, which had been sent to him from Africa, to the emperor of Japan, for which he received as an equivalent for the company, a present, to the value of sixty thousand crowns. * Teller also relates, that the great Mogul gave two thousand ducats for
for

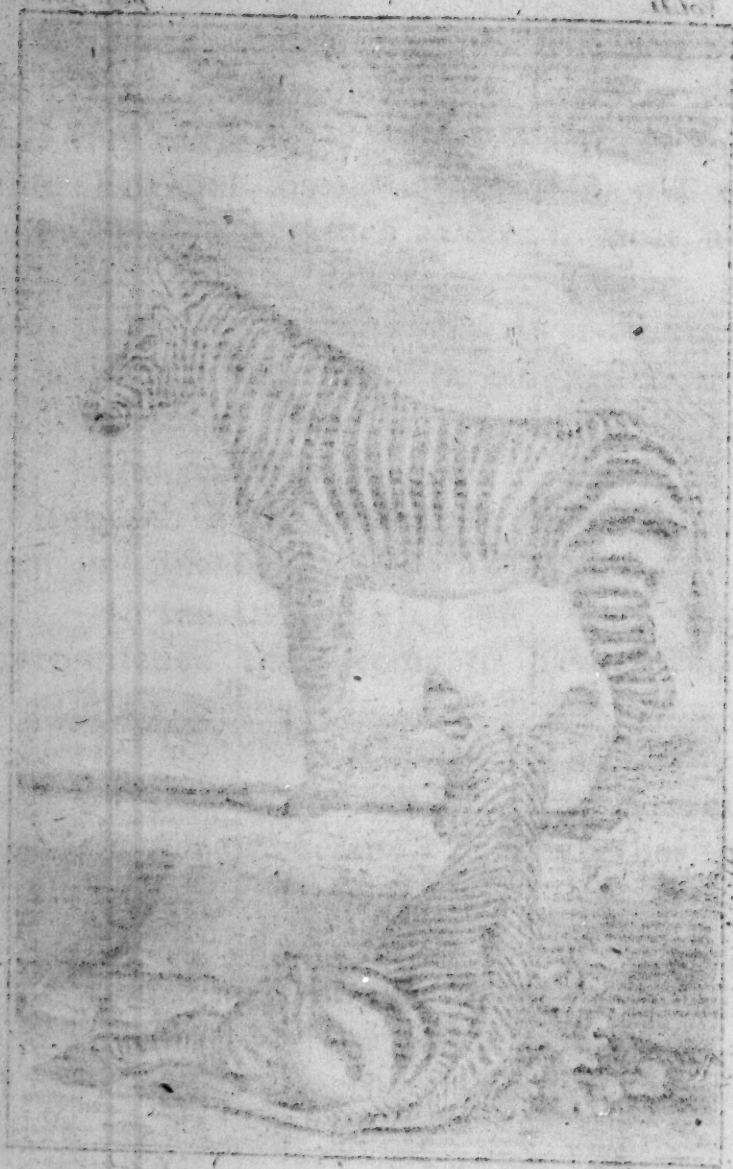
* Navendorf.



De Sme del.

Jr. Lodge sculp.

The Zebra.



The Tiger

for one of them. And it is frequent with the African ambassadors to the court of Constantinople, to bring some of these animals with them, as presents for the Grand Seignior.

END OF THE SECOND VOLUME.

